# MARINE REVIEW.

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## Money for Canal Surveys.

Contrary to expectations the United States senate added to the river and harbor bill appropriations aggregating $35,000 for canal schemes that were not recognized in the bill as it passed the house. The first of these appropriations is one of $5,000 to defray the expense of examining former reports of government engineers and determining the most feasible route for the Chesapeake and Delaware canal. Then there is $10,000 provided for the examination and survey of a route for a canal connecting Lake Superior with the Mississippi river.

The third project is one encouraged by Senators Sherman and Brice of Ohio for a canal to connect Lake Erie and the Ohio river. Although this scheme has repeatedly been pronounced worthless by representatives of the lake interests, the Ohio senators seem determined to encourge interior t wns of their state in the mistaken idea that it is possible to secure a part of the lake business through such a canal. The section of the bill covering this scheme is as follows: "That the secretary of war is hereby authorized and directed to appoint a board of three engineers of the army whose duty it shall be to survey the Miami and Erie canal, the Ohio canal and such branches thereof, and such river and stream channels as may, in their judgment form available portions of a continuous canal connecting the waters of Lake Erie with the Ohio river through the state of Ohio, and to report as to the feasibility and advisability of improving and widening such canal to 70 feet at the water line, and deepening the same to 7 feet, and by construction of new locks not less than 150 feet in length and 21 feet in width, with a capacity for vessels of at least 280 tons burden, and to report to the next session of congress with detailed plans and an estimate of the cost of such improvement; and $20,000, or so much thereof as may be necessary for the cost of said survey, is hereby appropriated. Provided, that nothing herein shall be construed to commit the government to proceed with the construction of said improvement."

## Corrected Charts.

The statement that certain revised charts of the St. Mary's river and Lake Superior, which are being prepared under the direction of Gen. Poe, corps of engineers, U. S. A., Detroit, would be ready for distribution in a few weeks is premature, as indicated by the following, which is a part of a letter from Gen. Poe on the subject: "I fear some misapprehension has gone abroad with reference to these revised charts. Those pertaining to the St. Mary's river, (including Hay lake channel), have been extensively corrected in manuscript and forwarded to Washington where the engraved plates will be corrected. How long this will require I do not know, but I feel sure that it will be done as quickly as possible. I think, however, that it will take more than a few weeks. The chart of Lake Superior on one sheet is still in the draftsman's hands in this office, and is likely to be for three months longer, or more, depending upon the interruptions to which the work is subjected. After it is sent to Washington it must be reproduced either by photo-lithography or engraving, and that will take some time, so that I greatly doubt whether it will be issued this season. As the newspapers have stated that it will be published within a few weeks, which is an impossibility, I trust you will correct the erroneous rumor, the origin of which is unknown to me. Certainly no such information has emanated from this office."

## Lumbermen Got in Their Work With the Senate.

When Cleveland officers of the Lake Carriers' Association read in the REVIEW last week a copy of the raft towing regulations contained in the river and harbor bill, as amended by the senate, they were astonished beyond all previous experience in legislative matters. They realized that the bill had not been properly attended to in Washington, and that the lumbermen, through senatorial influence, had so amended the rafting regulations that vessel owners will probably insist on having them stricken out of the bill altogether, and go all over the subject again in congress, if changes can not be made in conference before the measure comes up for final passage. As fixed up in the commerce committee of the senate, and as passed by the senate, the bill places no limit on the size of the rafts in St. Mary's river, although the board of engineers appointed to investigate the subject had recommended a limit of 600 feet in length and 60 feet in width for rafts passing through that waterway between Sault Ste. Marie and the head or Mud lake, at a point two miles below the Encampment crib light. For rafts passing through the Detroit and St. Clair rivers the senate increased the limit of size from 100 feet in width and 1,200 feet in length, as recommended by the engineers, to 200 feet and 2,200 feet respectively.

It will readily be seen that these changes, especially the absence of any limitation in the size of rafts in the St. Mary's river, practically amount to an abandonment of the most important features of the regulations Since the senate's action in the matter has been understood, numerous. telegrams and letters, urging that the regulations as adopted by the house be insisted upon in conference, have been forwarded to Waehington, and it may be that the quiet work of the lumbermen in the senate committee on commerce will be overcome, but this can not be done without a great effort.

## Time Schedule of the North West.

Several inquiries have been received regarding the time schedule of the Northern line passenger steamer North West. According to schedule the boat, bound up, should

| | |
|---|---|
| Leave Buffalo, Tuesdays | 9 p. m. |
| " Cleveland, Wednesdays | 8 a. m. |
| " Detroit, " | 3 p. m. |
| " Sault St. Marie, Thursdays | 12 noon |
| Arrive at Duluth, Fridays | 8 a. m. |

Bound down the lakes, her time for arriving at stopping points is as follows:

| | |
|---|---|
| Arrive Sault Ste. Marie, Saturdays | 12 noon |
| " Detroit, Sundays | 10 a. m. |
| " Cleveland, Sundays | 5 p. m. |
| " Buffalo, Mondays | 6 a. m. |

Eastern standard time at Buffalo; all other ports central standard time.

## The Eddy Leads in Ore, Grain and Coal.

The big straight-back steamer Selwyn Eddy, owned by Eddy Bros. of Bay City, delivered 4,252 net tons of hard coal in Chicago Tuesday from Buffalo, and now leads all lake vessels in big cargoes carried through connecting waters of the lakes. Her records are: 3,897 gross or 4,364 net tons of ore, Escanaba to Ashtabula; 130,820 bushels of wheat, Detroit to Buffalo; 4,252 net tons of coal, Buffalo to Chicago. The excess of ore over coal is due largely to the practice among lake steamers of taking on a supply of fuel at the lower port to last for the round trip, and thus cargoes in vessels bound down the lakes are in nearly all cases larger than taken up.

In connection with these records it may be well to note that the Eddy is not, however, to be credited with the largest cargo ever carried on the lakes. This distinction still belongs to the Minnesota line steamer Maritana, which carried 4,260 gross or 4,771 net tons of ore from Escanaba to South Chicago, a trade in in which the draft of water permits of probably any vessel on the lakes being loaded to full capacity.

## Millions Carried on New York Ferries.

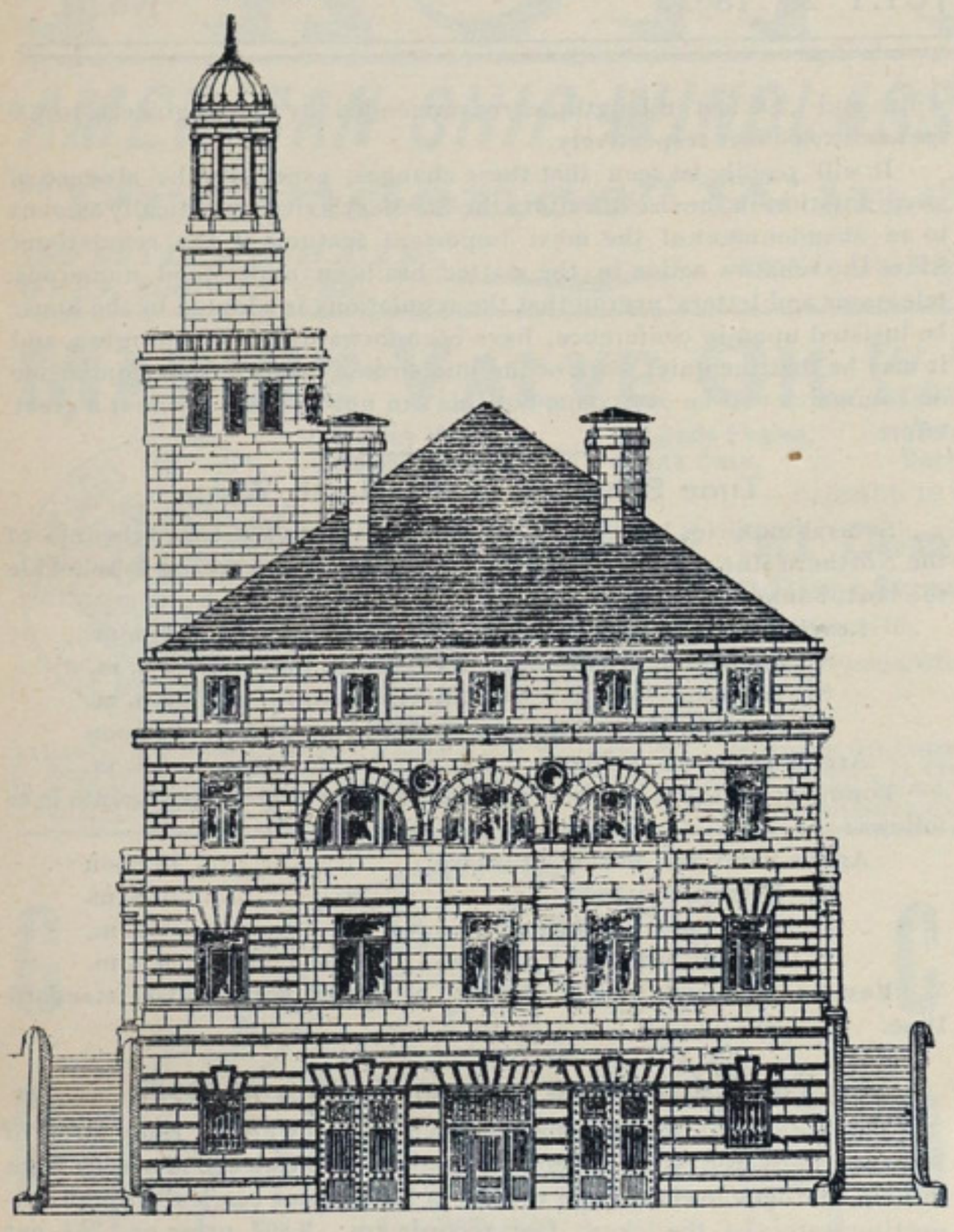
It is estimated that the yearly passenger trips on ferry boats between New Jersey and New York number 70,000,000; that the total for all New York ferries will exceed 170,000,000; that the number of boat trips equals 1,800,000, and the number of teams carried 5,000,000. All this immense traffic is carried on with remarkable safety. The lamentable accident to a Staten Island ferry boat, some twenty years ago, and a single collision afford the only cases of death from accident on record among North river ferry passengers. There have been other cases of death, but such as are not directly connected with the risks of the business, such as falling down companionways, being run over by teams, etc.— Col. A. E. Stevens in Cassier's Magazine.

Some idea may be had of the immense quantity of material used in the construction of the great Forth bridge when it is mentioned that it requires about fifty tons of paint to cover it, and that the area to be so dealt with means something like 120 acres. Notwithstanding that since the bridge was opened about 200 trains have passed over it daily, the wear and tear are scarcely perceptible, and the inclinations and deflections are quite unchanged.

"Country Homes" is the title of a pamphlet issued by the Nickel Plate road, giving a list of places open to summer boarders along the south shore of Lake Erie. Write for a copy. Aug 30

## New Canal Lock Building.

In the last issue of the REVIEW the office and power building for the new 800-foot lock, St. Mary's Falls canal, was described, and it was intended to publish an illustration of the structure. A view of the east elevation is shown in the engraving herewith. Bids for the construction of this building will be opened in the office of Gen. Poe, corps of engineers, U. S. A., Detroit, on Saturday, the 28th inst. It is expected that the excavation and foundation work, now under way, will be sufficiently advanced by the first of the coming month to permit the contractor to begin work on the building proper. It is required that at least the walls and ceiling of the building be erected by Nov. 1, 1894. The entire building is to completed on or before Dec. 31. 1895.



POWER HOUSE AND OFFICE FOR SAULT CANAL.

## Filling Up of Breakwater Enclosures.

A common criticism on the lakes regarding harbors of refuge made by the construction of breakwaters, is that they are constantly filling up and are practically worthless for the purpose for which they were constructed. In an article on "Breakwaters, Sea-Walls and Jetties," printed recently in one of the magazines, Mr. George Y. Wisner, civil engineer of Detroit, touches this subject.

"The functions of jetties and breakwaters," he says, "are usually threefold: (1) to concentrate river and tidal currents through the proper entrance channels; (2) to prevent sand and littoral drift from entering and being deposited in the harbor; and (3) to form shelter from heavy seas for the safe entrance and anchorage of ships. In a majority of cases the deterioration of harbors is largely due to the movement of sand parallel with adjacent shores, from wave and current action, and, if the structures are not so designed as to prevent such drift from being deposited under the shelter of the works constructed, they are certain to result in total failure. Littoral currents alone are not generally of sufficient force to produce erosion, but, when aided by wave-action, the drift is picked up and transported along the coast until some shelter is found where wave disturbance is not strong enough to hold the particles in suspension. Unfortunately, this condition often occurs behind breakwaters designed for the protecton of harbor entrances and anchorages.

"A fair example of such faulty design is shown by the rapid shoaling which has taken place in the great harbor of refuge formed by the Delaware breakwater, completed in 1869 at a cost of $2,750,000. The auchorage sheltered by the breakwater was from 25 to 30 feet deep when the work was completed, but it has gradually shoaled so that at present there is but little of the protected area over 16 feet deep.

"At the recent International Engineering Congress Mr. J. P. Griffith of Dublin, said: 'The keynote to the success which has attended the efforts made to improve the Dublin bar has been due to a full appreciation of the littoral and tidal currents by the engineers who designed the works. Dublin bar has been improved by artificial scour resulting from the construction of a tidal reservoir of 2,500 acres, enclosed by two great piers extending out over the strands of Dublin bay. These piers have been so formed as to make the outward scouring current flow in unison with, and not in opposition to, the littoral currents of the bay.'

"The failure to fully appreciate the effect of littoral currents by engineers has been the cause of their adopting plans for improving several important American harbors which have totally failed to produce the results anticipated and predicted. The design for the improvement of Galveston harbor by means of jetties is a notable example of this class of work. The general direction of the littoral drift on that cost is from the northeast to the southwest; yet the jetties, on which upwards of $4,000,000 have already have been expended, are faced directly to the eastward. The results thus far obtained have been an increase of channel depth on bar of about two feet, an abnormal movement seaward of the outer face of the bar, and the development of an eddy to the south of the works of such magnitude that the city front has been washed away in places a width of nearly 1,000 feet, while during the past ten years, the loss of nearly sixty acres of city property has occured. The problem that now confronts the citizens of the Island City is, whether they will have any city left by the time a deep water channel is obtained across the harbor bar."

## Origin of the Ice Crushers.

A Cheboygan correspondent of the Detroit Journal has had an interview with Capt. Ed. Bonchard of Thompson Smith's Sons' big raft-towing tug Duncan City, who claims that the big ice crushers of the Straits of Mackinaw, St. Ignace and Ste. Marie, with their system of screws fore and aft, are but the result of a haphazard forcing of the straits in the spring of 1866.

Very early in 1866, according to the Cheboygan captain's story, the Northern Transit steamers City of Boston and State of Maine, which then formed part of a daily service between Chicago and Ogdensburg, reached the straits. The ice was heavy, and although it was broken and floating, it defied the efforts to get through. Finally, one of the captains—Capt. Bonchard thinks it was Capt. Sullivan—had a happy thought, and after some persuasion he induced the captain of the other boat to try it, and it worked to a charm. It was to lash the boats together, bows on, one to be pushed into the ice stern foremost, reversing her screw to crush the ice and push it away, and the other to keep the boats going down the straits. The effort was a complete success and both boats got through in good time and without accident. So far as the records go, then, this was the first time boats were ever used in this way, or that the double-ender principle of the ice crushers now used in the straits was utilized.

## Stocks of Grain at Lake Ports.

The following table, prepared from reports of the Chicago board of trade, shows the stocks of wheat and corn in store at the principal points of accumulation on the lakes on July 21, 1894:

| | Wheat, bu. | Corn, bu. |
|---|---|---|
| Chicago | 16,530,000 | 1,633,000 |
| Duluth | 4,159,000 | ..... |
| Milwaukee | 960,000 | ..... |
| Detroit | 807,000 | 2,000 |
| Toledo | 1,371,000 | 89,000 |
| Buffalo | 1,208,000 | 133,000 |
| Total | 25,035,000 | 1,807,000 |

At the points named there is a net decrease for the week of 929,000 bushels of wheat, an increase of 719,000 bushels of corn.

There is not a dry dock on this hemisphere in which the battleship Indiana, now nearly ready for delivery, can be placed. The completion of all three of the government docks under construction that are capable of floating a ship of the size of the Indiana is very much delayed from various causes. The greatest delay is with the Gillies dock in the navy yard, Brooklyn, which is to be 670 feet long. The other docks that are to be large enough but not yet completed are at Port Royal, S. C., and Fort Orchard, Wash., docks.

IF YOU ARE INTERESTED IN THE NEW UNITED STATES NAVY, YOU WILL WANT PICTURES OF THE NEW YORK, (SEE SUPPLEMENT IN LAST ISSUE.) PHILADELPHIA, BALTIMORE AND VESUVIUS, STEEL ENGRAVED ON HEAVY CARD BOARD 10x14 INCHES. SEND $1 FOR THE FOUR TO THE MARINE REVIEW, 516 PERRY-PAYNE BUILDING, CLEVELAND, O., AND WE WILL ADD A COLOR ETCHING OF THE STEEL STEAMER GRATWICK, FREE.

To Chatauqua lake free in connection with a $3.00 Niagara Falls ticket over the Nickel Plate road. Toronto $1.00 extra. No. 224 Bank street and 534 Pearl street, and depots, Cleveland. 26

## Tips from the Man on the Dock.

In glancing over the marine column of one of the daily papers on the morning following the Glorious Fourth, I ran across a simple item saying the steamer Pyrotechnics had been chartered the day before for a cargo of grain. Some joker had gotten in his work on a novice among the marine reporters, but the victim in this case was fortunate as compared with some of his professional brethren who fell into the hands of wags around ship brokers' offices in days gone by. Among lake men, some of the yarns told about the mythical Capt. Wm. Togus and his many lines of new lake ships have been repeated about as often as the tales of the lost Charley Ross, but one of these stories that concerns Cleveland people has at least not been referred to of late, and I am reminded of it by the note connecting the fireworks term with the charter of a ship. It was about '86 that the Capt. Togus stories were most numerous around the docks and offices of vessel owners. That year marked the beginning of the several years of prosperous times on the lakes that ended with '93. Freights in the fall went to $2 75 a ton from the head of Lake Superior, and the few steel ship yards then equipped for work on a large scale had more than they could do at their own prices. Contracts for new ships were reported from all parts of the lakes, and there was no hesitancy in accepting as truth even a report of a fleet of a half dozen or more steamers being contracted for by one concern.

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Nicholas Boylan, now prominent among the fuel merchants of Cleveland, had just begun to sell coal to steamboat captains on the docks. His early experience in the business was most enthusiastic, and the captain that fueled at his dock in those days was treated to more than the ordinary liquid refreshments of River street. A supper at a well known uptown restaurant, the front door key of which is said to have been thrown away on the day the place was opened, was a part of Nick's hospitality, and together with a captain of one of the Buffalo line boats, he was enjoying a sumptuous meal one evening, when John Bartow dropped in to entertain Ham Mills and a party of friends from Buffalo. One of the visitors from Buffalo was introduced to Nick as Capt. Wm. Togus, who was in Cleveland for the purpose of securing dock space and completing all arrangements for a fast line of steamships, that were to compete with the Lake Shore Railway Company for passenger traffic exclusively between Toledo and Buffalo. The ships were to surpass in both speed and elegance the far-famed Western Metropolis and City of Buffalo, that were engaged in the same service thirty years ago and have ever since been talked of as the greatest craft known to fresh water. Of course, the boats could be fueled here, as Cleveland was an objective point with them, and particular stress was laid upon this feature of the conversation for the benefit of the ambitious young coal merchant, who had already shown sufficient interest to invite the visitors to join in the repast. Wines and cigars of the best the place afforded followed thick and fast after a contract for fueling the prospective new ships had been made, in the presence of the several witnesses, between the fuel merchant and the guest from Buffalo, who had acted well the part of the imaginary Capt. Togus.

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Bidding the party of vessel owners good night, Nick's feelings of rejoicing over having secured his first big contract for fuel were mingled with delight in being able to repay the marine reporter of the Cleveland Herald, then one of the leading morning newspapers, for favors he had received in the way of telegraphic reports of vessels passing Detroit in the afternoon, and which might be expected in Cleveland for fuel during the night. Accordingly, he hurried to the newspaper office to give his friend a genuine "scoop." The jig was about up, as the saying is when the last take has gone to the printer, and the marine man had gone home, but Howard Burgess, now city clerk in Cleveland, was then assistant city editor of the Herald. He knew a good story when he heard it, but was, of course, unacquainted with any of the Capt. Togus yarns afloat at the time. The last form was held in the composing room, and Nick's description of the elaborate passenger ships, with some exaggeration on the original, appeared under a display head the next morning. It is needless to say that a two-line note served for a correction in the Herald the following day, and the young coal merchant was unheard of beyond the river district for some time afterward.

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Probably some of the readers of this column may recall other stories of the Capt. Togus order that would prove interesting. If so, I would be pleased to hear from them, and in any event, I have some notes with which to continue the tale related above.

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Toronto, Ont., $1.00 in connection with a Niagara Falls excursion ticket, Aug. 2, via the Nickel Plate road. Inquire of the nearest agent. 26

The Nickel Plate road runs a low rate excursion to Niagara Falls, Thursday, Aug. 2. Ask agents. 26

$3.00 to Niagara Falls and return, Aug. 2. Ask agents of the Nickel Plate road. 26

## Speed and Cargo Records.—Lake Freight Boats.

Iron ore.—Maritana, Minnesota Steamship Company of Cleveland, 4,260 gross or 4,771 net tons, Escanaba to South Chicago; Selwyn Eddy, Eddy Bros. of Bay City, Mich., 3,897 gross or 4,364 net tons, Escanaba to Ashtabula; S. S. Curry, Hawgood & Avery Transit Company of Cleveland, 3,852 gross or 4,314 net tons, Escanaba to Fairport; Kearsarge, Interlake Company of Cleveland, 3,718 gross or 4,164 net tons, Escanaba to Cleveland.

Grain.—Selwyn Eddy, Eddy Transportation Company of Bay City, 130,820 bushels of wheat, Detroit to Buffalo; Centurion, Hopkins Transportation Company of St. Clair, Mich., 147,812 bushels of corn, Chicago to Erie; Onoko, Minch estate of Cleveland, 187,657 bushels oats, Chicago to Buffalo.

Coal.—Selwyn Eddy, Eddy Bros. of Bay City, Mich., 4,252 net tons anthracite, Buffalo to Chicago.

Speed.—Owego, Union Line of Buffalo, Buffalo to Chicago, 889 miles, 54 hours and 16 minutes, 16.4 miles an hour.

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## Lake Freight Matters.

About the only change that has occurred in the freight market for several days past is a more active resumption of coal shipments, and a demand for vessels that may result in an advance of rates to Lake Michigan with the close of the present week. Shippers who have large quantities of coal to go to the head of Lake Superior are asking for bids on some of it to be carried throughout the balance of the season, and it is reported that one or two contracts have been made at 37½ cents, but there is nothing definite about rumors regarding the contracts.

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## Full List of Lake Items in the River and Harbor Bill.

Appropriations for the improvement of rivers and harbors in the lake region, as contained in the river and harbor bill, which passed both houses of congress, are printed herewith. They aggregate $2,064,000. A few unimportant changes may be made in the measure by the conference committee, in whose hands it now rests, but is not probable that any of the money items allotted to the lakes will be changed. Following is the list:

Buffalo, N. Y.—Continuing improvement ,$70,000, of which $5,000 may be used in making a survey and plan for extending the outer breakwater from a point at or near the present outer breakwater southeasterly to a point at or near Stoney point.

Charlotte, N. Y.—Continuing improvement, $15,000.

Dunkirk, N. Y.—Continuing improvement, $20,000.

Great Sodus Bay, N. Y.—Cantinuing improvement, $15,000.

Little Sodus Bay, N. Y.—Continuing improvement, $8,000.

Ogdensburg, N. Y.—Continuing improvement, $20,000.

Oswego, N. Y.—Continuing improvement, $37,000, of which $10,000 shall be expended in repairing the breach recently made in the breakwater; and not exceeding $10,000 of which may, in the discretion of the secretary of war, be used for removing rock to widen and deepen the inner harbor near the mouth of the Oswego river.

Tonawanda harbor and Niagara river, N. Y.—Continuing improvement, $50,000: improving Niagara river from Tonawanda to Fort Day, $20,000, and the unexpended balance of the appropriation heretofore made for this improvement is hereby reappropriated.

Erie, Pa.—Continuing improvement, $10,000.

Ashtabula, O.—Continuing improvement, $75,000 including a survey to determine what improvement thereof should be made with a view to making it a harbor of refuge and enlarging its capacity for the purposes of commerce.

Black River, (Lorain) O.—Continuing improvement, $10,000.

Cleveland, O.—Continuing improvement, $50,000.

Fairport, O.—Continuing improvement, $20,000.

Huron, O.—Continuing improvement, $10,000.

Port Clinton, O.—Continuing improvement, $6,000.

Sandusky, O.—Continuing improvement, $30,000, $5,000 of which may be used in removing shoal at outer approach to harbor, and the secretary of war is authorized and directed, in his direction, to cause a survey, if necessary for the purpose, and an estimate to be made of the cost of further necessary improvement of said harbor, including the channel over said outer bar.

Toledo, straight channel through Maumee bay, O.—Continuing improvement, $75,000, a part of which may be used in the discretion of the secretary of war, in removing shoal in the old channel and in extending the improvement up the Maumee river.

Conneaut, O.—Continuing improvement according to the existing plan, $40,000.

Vermillion, O.—For maintenance and repairs, $2,000.

Michigan City, Ind.—Continuing improvement, outer harbor, $21,000; continuing improvement, inner harbor, $10,000.

Calumet. Ill.—For maintenance of existing works, $15,000, including survey with a view to such additional improvement as may be required.

Chicago, Ill.—Completing improvement, $80,000, and the secretary of war may, in his discretion, use $25,000 of this sum in the improvement of Chicago river, up to the forks of said river.

Waukegan. Ill.—Continuing improvement, $20,000.

Charlevoix and entrance to Pine lake, Mich.—Continuing improvement, $8,000.

Frankfort, Mich.—Continuing improvement, and repairs, $50,000.

Grand Haven, Mich.—Continuing improvement, $25,000.

Grand Marais, Mich., harbor of refuge.—Continuing improvement, $20,000.

Manistee, Mich.—Continuing improvements, and for repairs, $12,000; provided that no part of this sum shall be used in aid of the inner navigation until the city authorities, or private owners, have taken proper steps to prevent erosion of the banks and the washing of silt into the bed of the river.

Holland (Black lake), Mich.—Completing improvement, $15,000.

Monroe, Mich.—Continuing improvement, and maintenance, $5,000.

Muskegon, Mich.—Continuing improvement, $30,000.

Ontonagon, Mich.—Continuing improvement, and for repairs, $7.000.

Pentwater, Mich.—Continuing improvement, $5,000.

Sand Beach, Mich.—Continuing improvement according to the existing project, $20,000.

Portage Lake, Mich.—Continuing improvement, $25,000.

St. Joseph, Mich.—Continuing improvement, $30,000.

South Haven, Mich.—Continuing improvement, $20,000.

White Lake, Mich.—Continuing improvement, $5,000.

Marquette, Mich.—Continuing improvement, $30,000.

Ludington, Mich.—Continuing improvement, $6,000.

Petoskey, Mich.—Ten thousand dollars, to be expended together with the unexpended appropriations for this harbor, according to the larger of the two projects submitted in the report of Dec. 21, 1889, and printed in the annual report for 1890, pages 2,674 and 2,675.

Saugatuck, Mich —Continuing improvement and for restraining works to prevent the drifting of sand into the harbor, $12,000.

Menominee, Mich., and Wis.—Continuing improvement, $10,000.

Cheboygan, Mich.—The secretary of war is hereby directed to expend the unexpended balance on hand in dredging. He is also directed to make an estimate of the amount required to deepen the present channel to a depth of 18 feet.

Ahnapee, Wis.—Continuing improvement, $5,000.

Green Bay, Wis.—Continuing improvement, $25,000.

Kenosha, Wis.—Continuing improvement, $15,000.

Kewaunee, Wis.—Continuing improvement, $20,000.

Manitowoc, Wis.—Continuing improvement, and maintenance, $25,000.

Milwaukee, Wis.—Continuing improvement, harbor of refuge, $45,000; for repairs of piers and dredging, $7,000, and including survey of the harbor at South Milwaukee with a view to the improvement thereof.

Port Washington, Wis.—Continuing improvement, $5,000.

Racine, Wis.—Continuing improvement, $20,000.

Superior bay and St. Louis bay, Wis.—Continuing improvement, $50,000, a portion of which may, in the discretion of tho secretary of war, be used in dredging in Superior bay along the dock line between the Quebec channel and the main channel opposite the base of Connor's point; provided, that so much of the said sum as may be necessary may be used for the purpose of making a survey of said harbor with a view of deepening it to 20 feet and making estimates therefor.

Sheboygan, Wis.—Continuing improvement, $25,000, of which the sum of $439.65 may be paid by the secretary of war to the C. Reiss Coal Company of Sheboygan, for dredging done by them in the harbor.

Ashland, Wis.—Continning improvement, $25,000.

Two Rivers, Wis.—Continuing improvement $6,000.

Sturgeon, Bay canal, harbor of refuge, Wis.—For maintenance of channel and piers, $5,000.

Oconto, Wis.—To maintain works, $3,000; provided that so much of said sum as may be necessary may be used for the purpose of making a survey and submitting plans and estimates for the improvement and confinement of the current in the river to maintain a standard depth of water, and to obtain a channel 16 feet deep; and for extending the piers and for the construction of a harbor 16 feet deep in Green bay exterior to the river channel.

Duluth, Minn.—Harbor improvements including repairs to the canal, piers, the channel on the north shore of St. Louis bay and the St. Louis river, $75,000, of which an amount not to exceed $25,000, in the discretion of the secretary of war, may be expended in the channel of St. Louis river above Grassy point; provided, that so much of said sum as may be necessary may be used for the purpose of making a survey of said harbor with a view of deepening it to 20 feet and making estimates therefor. The secretary of war is authorized to negotiate with the city of Duluth for the unconditional donation of the land needed for said canal, canal entrances, and piers, accompanied by vacation of the abutting streets. In the event the city refuses to make an unconditional donation, but accompanies the donation with the reservation of a right of way for a tunnel, the secretary of war may accept such conditional donation of the land, provided the said tunnel follows such lines and grades as he may approve.

Grand Marais, Minn.—Continuing improvement, $3,000.

Agate Bay, Minn.—Continuing improvement, $30,000.

St. Lawrence river, New York.—Continuing improvement on shoal between Sister islands and Cross-Over light, St. Lawrence river, and in St. Lawrence river between Ogdensburg and the foot of Lake Ontario, $8,000.

Saginaw river, Michigan.—Continuing improvement, $40,000, of which $16,000, or such less sum as may be necessary, shall be expended on the river above Bay City.

St. Clair Flats ship-canal, Michigan.—All work pertaining to this canal is hereby declared to be embraced within the project adopted by the act approved July 13. 1892, and the secretary of war is directed to perform the same in accordance therewith.

Black river, at Port Huron, Mich.—Continuing improvement up to Washington avenue, $4,000; continuing improvement at mouth of river, $4,000.

Clinton river, Michigan.—Continuing improvement, $5,000.

Rouge river, Michigan.—Continuing improvement, $5,000.

Detroit river, Michigan.—Continuing improvement by removal of shoals from the city of Detroit to Lake Erie, $30,000.

Alpena, Mich.—Continuing improvement, $4,000.

Kewenaw point, Michigan.—Improving the water communication across Keweenaw point, Lake Superior, from Keweenaw bay to Lake Superior, in accordance with the existing project, $160,000.

St. Joseph river, Michigan.—Continuing improvement, $500.

Chippewa river, including Yellow Banks, Wisconsin.—Continuing improvement, including a survey of the river for two miles south of Dells Dam, $10,000.

Fox river, Wisconsin.—Continuing improvement, $37,500, or so much thereof as may be necessary, may be used for work in the harbor of Fond du Lac, Wis., and approaches thereto; of which said sum, $2,500, or so much thereof as shall be necessary, shall be used in the removal of the bar that exists at the intersection of Fox river with Big Lake Buttesdesmorts, and $5,000, or so much thereof as may be necessary, may be used in erecting, operating, and maintaining on the Menasha dam slash boards to be so adjusted as to raise said dam one foot in height; provided, however, that said dan shall not be raised if, in the judgment of the engineers or the secretary of war, there is any possibility of any damage whatsoever being inflicted upon any private property by flowage of water or otherwise.

St. Croix river, Wisconsin and Minnesota.—Continuing improvement, $4,000.

Menominee river, Michigan and Wisconsin.—Continuing improvement, $6,000.

Sturgeon Bay and Lake Michigan ship-canal.—Continuing improvement, $20,000.

Calumet river, Indiana and Illinois.—Continuing improvement, $45,000, of which $35,000 is to be used below the forks of the river and $10,000 above the forks to one-half mile east of Hammond.

Illinois river, Illinois.—Continuing improvement, $35,000.

Illinois and Mississippi canal.—Continuing construction, $190,000.

## Iron Ores of the Mesabi Range.*

The information on which this paper is based was gathered by the writer while in the employ of the geological survey of Minnesota. Only an outline of some of the more important results of this study is given here. The Mesabi range in Minnesota may be separated into three geographical divisions characterized by sufficient geographical differences: The western Mesabi, which extends from the Mississippi to the Embarras lakes on the eastern edge of range 16 W.; the eastern Mesabi, reaching from the Embarras lakes to the region of Gunflint lake; and the international boundary division, which stretches from Gunflint lake east to Pigeon point. In the western Mesabi region lie all the mines at present worked, and it is to this section alone that the observations made in this paper are intended to be strictly applicable. The chief ore bearing district lies between the Mesabi Chief mine on the west and the Hale on the east, a distance of about forty miles. The lowest rocks of the region are greenish schists, which belong in the Keewatin formation. These schists are cut by a great belt of intrusive granite, which runs the entire length of the iron bearing district and usually forms the summit of the divide between the Mississippi and the Red river basins. Unconformably upon these older rocks lie the gently dipping Animikie strata. There are three chief members of the Animikie in the iron bearing regions, as definitely known at present. Lowest is a quartzite; upon this lie the iron bearing rocks; and finally there is a great thickness of black slates. The base of

*Abstract from an article by J. E. Spurr in the American Geologist; reprinted from the Engineering and Mining Journal, in which it was published by permission of the state geologist of Minnesota.

the slates is calcareous, and becomes in places an impure limestone, often dolomitized or sideritized. The iron bearing rocks occupy a definite and constant horizon between the quartzite and the slates. They are marked by peculiar and characteristic features, and have always been recognized as invariably associated with the ore deposits. They seem to have nearly uniform thickness, which may be estimated as between 500 and 1,000 feet, with an average of perhaps 800 feet. The relationship of these several formations is shown by the section forming Fig. 1.

The ore bearing region of the western Mesabi affords a peculiarly valuable field for investigation, for the rocks have suffered only very slight disturbance since the time of their deposition. The general structure is a monocline, which dips slightly east of south, at a gentle angle which averages perhaps 10° to 15°. On the eastern end of the western Mesabi there has been some slight additional disturbance. There is evidence leading to the belief that a wedge-shaped area eight or ten miles in length, lying mainly in township 58-17, has been faulted up above the surrounding rocks, the amount of vertical displacement being perhaps 500 feet. This may be called the Virginia area, from the town of that name which is in the vicinity. To the east of this upthrust area there is, as far as the Embarras lakes at least (a distance of five or six miles), a gentle folding of the strata, which appears to have been contemporaneous with the faulting. These disturbances may be provisionally believed to have occurred in later Keweenawan or post Keweenawan time, and to have been contemporaneous with the monoclinal tilting. Fig. 2 is a section from

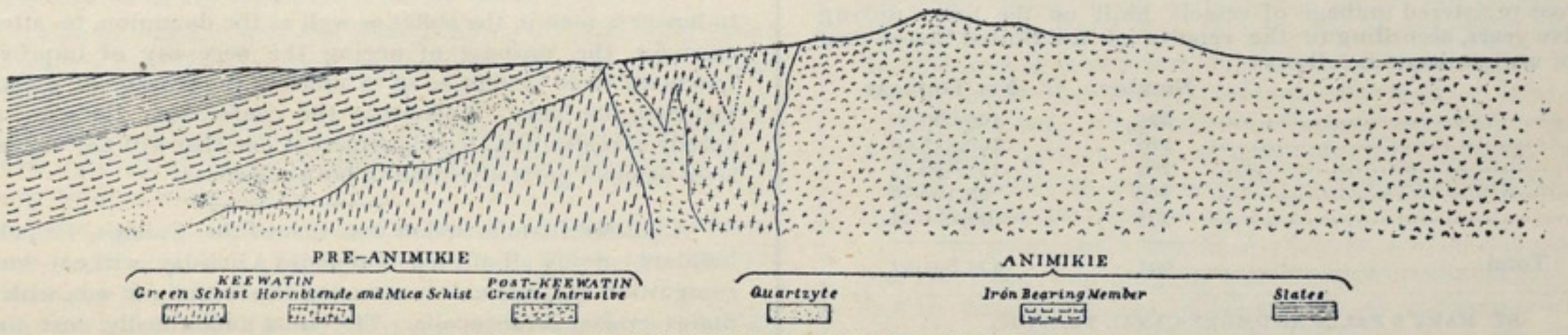



FIG. 1.—SECTION ACROSS THE MESABI RANGE.

Drawn north and south through the middle of townships 58-18 and 59-18, passing through the town of Mountain Iron.

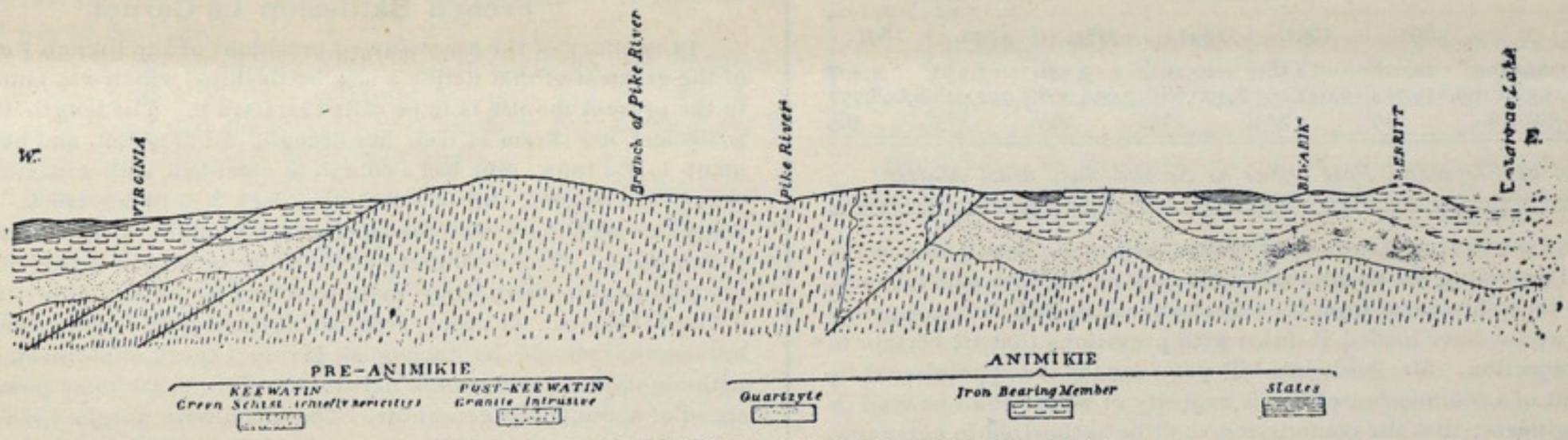



FIG. 2.—SECTION ACROSS THE VIRGINIA AREA.

Drawn east and west through townships 58-16 and 58-17, passing through the towns of Virginia, Biwabik and Merritt.

Horizontal scale of sections, 2-3 inch = 1 mile. Vertical representation of strata twice exaggerated; of topography, six times exaggerated.

west to east across these faulted and folded strata.

The rocks of the iron bearing member exhibit great diversity. The most common sort is massive and siliceous, and is thickly spotted with small round darker areas consisting mainly of iron oxide. From this there are many deviations but all the rocks of the iron bearing member, however different, are closely allied in origin, and were probably derived from a single primitive type.

It is evident from observation that the bands of iron owe their existence to previously formed zones of weakness. From the narrow band there may be found every gradation upward in size, till the body of iron becomes large enough to merit the name of an ore deposit. These ore deposits are often very large, being occasionally nearly a mile in their longest extent. The ore is usually hematite, loose and granular, and when of best quality is of a blue or brown color. Typically there is a portion, near the surface, which has become hydrated into yellow limonite or gothite. Often these ore bodies rest upon the basal quartzite; often again they rest upon the hard and little altered iron bearing rock itself. The conditions under which they form seem identical with those necessary for the growth of the narrow bands of iron in the banded "jasper and ore." In both cases the iron has concentrated in an area of especial weakness. In considering the cause of the formation of the ore bodies, it is only necessary to find the cause of the development of so great regions of weakness.

The richest ore producing region thus far developed is that which lies in township 58-17, and surrounds the Virginia area, following the supposed fault lines. Immediately east of these lies another rich group, near Biwabik, in the somewhat disturbed strata adjacent to the upthrust area. At the Mountain Iron mine there is strong microscopic evidence of a disturbance, probably a fault, while at the other important mines there has not been sufficient exploration to enable one to determine their peculiarities. So the conclusion may be reached that the most important of the ore bodies owe their existence to regional disturbances which have produced large areas of weakness. The eastern Mesabi differs in regard to its iron from the western Mesabi in that it contains a much larger proportion of magnetite, which is associated with somewhat more chrystalline silica. As these peculiarities are associated with the presence of the igneous rocks of the Keweenawan, and since they fade out as the distance from the Keweenawan area increases, it appears probable that, as has been suggested by H. V. Winchell, the advent of these rocks was in some way connected with the magnetic condition of the iron. If this be the case, we must conclude that most of the banded magnetite of the eastern Mesabi had become concentrated prior to Keweenawan time. But the lack of large ore bodies in this region shows that up to this time the concentration had not occurred on a very large scale. It is probable that the same force which produced magnetization put a serious check upon the separation and concentration of the constituents of the rocks, causing the degree of concentration in that region at the present time to be behind that of the western Mesabi.

There are upon the Mesabi small patches of Cretaceous rocks, lying upon the Animikie strata. In the area examined, they are chiefly conglomeratic, and the fragments are mainly derived from the iron bearing rocks. A study of these fragments shows two things—first, that at the time of the formation of the conglomerate there existed hard iron ore in the iron bearing member, and second, that much of the rock has been decomposed and has had its iron concentrated subsequently to being taken into the Cretaceous beds. We may conclude that the process of concentration has been going forward since early Keweenawan or pre-Keweenawan time, and there is abundant evidence that it is going on at the present day. The more important points in regard to the ores of the Mesabi which this paper presents are these:

1. The original rock is probably an altered greensand, in which the iron exists in the form of the hydrous silicate glauconite, a mineral which is supposed to be formed at the present day on moderately deep areas of the sea beds adjoining coast lines, by the action of decaying organic matter upon fine mineral particles derived chiefly from subaerial erosion.

2. The decomposition of this mineral, producing chiefly iron oxide and cryptocrystalline silica, and the concentration of these, together with the various phenomena consequent upon these operations, have produced all the various phases of the iron bearing rock, including the ore bodies.

3. During the process of concentration, in areas of comparatively free oxidation, iron replaces silica; in areas of extremely scant oxidation silica replaces iron.

4. The great ore deposits are believed to be formed in large areas of weakness, which have chiefly resulted from regional disturbances. The date of these disturbances and of the beginning of the formation of some of the largest ore deposits is provisionally assigned to Keweenawan time.

# MARINE REVIEW.

*DEVOTED TO THE LAKE MARINE AND KINDRED INTERESTS.*

Published every Thursday at No. 516 Perry-Payne building, Cleveland, O.
Chicago office, (branch), No. 726 Phoenix building.

SUBSCRIPTION—$2.00 per year in advance. Single copies 10 cents each. Convenient binders sent, post paid, 75 cents. Advertising rates on application.


The books of the United States treasury department contain the names of 3,761 vessels, of 1,261,067.22 gross tons register in the lake trade. The lakes have more steam vessels of 1,000 to 2,500 tons than the combined ownership of this class of vessels in all other sections of the country. The number of steam vessels of 1,000 to 2,500 tons on the lakes on June 30, 1893, was 318 and their aggregate gross tonnage 525,778.57; in all other parts of the country the number of this class of vessels was,on the same date, 211 and their gross tonnage 314,016.65. The classification of the entire lake fleet on June 30, 1893, was as follows:

| Class. | Number. | Gross. Tonnage. |
|---|---|---|
| Steam vessels | 1,731 | 828,702.29 |
| Sailing vessels | 1,205 | 317,789.37 |
| Canal boats | 743 | 76,843 57 |
| Barges | 82 | 37,731.99 |
| Total | 3,761 | 1,261,067.22 |

The gross registered tonnage of vessels built on the lakes during the past five years, according to the reports of the United States commissioner of navigation, is as follows:

| | Number. | Net Tonnage. |
|---|---|---|
| 1889 | 225 | 107,080.30 |
| 1890 | 218 | 108,515.00 |
| 1891 | 204 | 111,856.45 |
| 1892 | 169 | 45,168.98 |
| 1893 | 175 | 99,271.24 |
| Total | 991 | 471,891.97 |

ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC.

| | St. Mary's Falls Canal. | | | Suez Canal. | | |
|---|---|---|---|---|---|---|
| | 1893 | 1892. | 1891. | 1893. | 1892. | 1891. |
| No. vessel passages | 12,008 | 12,580 | 10,191 | 3,341 | 3,559 | 4,207 |
| Ton'ge, net regist'd | 9,849,754 | 10,647,203 | 8,400,685 | 7,659,068 | 7,712,028 | 8,698,777 |
| Days of navigation.. | 219 | 223 | 225 | 365 | 365 | 365 |

*Entered at Cleveland Post Office as Second-class Mail Matter.*

IF REPRESENTATIVE BALDWIN of Duluth had really hoped for success with his bill providing for an appropriation of $100,000, with which to survey a route for a ship-canal from the lakes to the seaboard, it is not probable that he would have loaded it down with provisions that are certain to meet with objection. Mr. Baldwin's bill provides for the appointment by the president of a commission of five, a majority of whom shall be civil or military engineers; that the commission shall be authorized to enter into negotiations with Canada for such rights and privileges as may be found necessary, and that the canal shall be constructed, owned, managed and operated by the government of the United States, subject to such joint ownership and control by the Canadian government as may be found necessary for any part of said canal that may be located and constructed through Canadian territory. It is provided further that such part of said canal as may be constructed in Canada shall be subject to such joint ownership and control by the government of Canada and the government of the United States as may be agreed upon by treaty between these countries, and for the purpose of constructing the canal under the provisions of the act, it is proposed to issue bonds of the United States in any amount equal to the cost of construction, in denominations of $25, $50, $100 and $1,000, drawing interest at the rate of 2 per cent. per annum and payable at the option of the government, on demand of the holder, at any time after the expiration of twenty years from date of issue. All this sounds well enough, but the bill is entirely too sweeping in its nature and aims at too much in one jump. Let the northwestern advocates of the big canal scheme aim to secure a moderate appropriation for an investigation and survey by our own engineers, and they will be more liable to secure a start for the project, as for a reasonable measure of this kind they will have the support of most representatives of lake districts in congress.

IF REVENUE CUTTER officers were as active in hunting down flagrant violations of the customs laws as they are in reporting unimportant omissions on the part of vessel captains, their services would be more generally appreciated. The Menominee line steamer Norman, which was fined $1,000 a few days ago for not, according to passenger boat regulations, having her life boats hanging to davits, is not a passenger boat at all, but simply takes out a passenger license, for the purpose of accommodating, during the summer, a few friends of her owners. At an outside, the boat's passenger accommodations will not provide for more than four persons. When the facts are explained, the secretary of the treasury will in all probability remit all, or nearly all, of the fine. The rule regarding the hanging of life boats on davits applies only to passenger steamers, so that masters of freight boats need not feel concerned in the matter.

NOW THE MIDDLE of August is the time fixed, according to reports from Ottawa, for the opening of the Canadian Sault canal. Credit is due the dominion government and the canal contractors for rapid work on this project, but, to use a common phrase, vessel owners on this side "will not be safe" in basing any business on a hope that the canal will be open to large vessels this year. There has been some talk of defective masonry work in the canal, and engineers who have examined the work say that the walls in two places are uneven, showing signs of weakness, but there is nothing official or definite on this point.

AN AUTHORITY on railway matters, the president of one of the big trunk lines, says that the consent of 377 managers of systems and branches of railway in this country is required in certain agreements that are made relative to traffic affairs. And yet, although it is within their power, fifteen vessel owners on the lakes stand in their own light in neglecting to insist upon being paid fair rates for carrying coal.

CITY AUTHORITIES in Toronto propose to send out 10,000 invitations to business men in the states as well as the dominion, to attend a conference for the purpose of urging the necessity of improving the St. Lawrence canal system, so as to admit of the passage of ocean vessels to and from the lakes. Encourage the conference. Its aims may not be speedy of realization, but the object is one that will not down, and must soon demand great attention in both countries.

A COMMENDABLE action was that of the Cramps, Philadelphia ship builders, giving all of their employes a holiday without loss of pay, in recognition of their aid in securing the premium won with the United States cruiser Minneapolis. The treat undoubtedly cost the builders a snug sum.

## French Battleship Le Carnot.

In memory of the assassinated president of the French Republic, one of the greatest of that nation's new battleships, which was launched early in the present month, is to be called Le Carnot. The length of the vessel is 396 feet, her beam 71 feet, her draught aft 27½ feet, and her displacement 11,882 tons. She has a complete steel belt with a maximum thickness of 17.7 inches, and a curved steel deck 2.75 inches thick. Above the water line belt there rises for an additional height of 4 feet a steel belt of 4-inch armor. The machinery of the ship consists of a pair of compound vertical engines with three cylinders, fed by twenty-four Lagrafel and d'Allest boilers. At ninety-five revolutions with forced draught, 13,500 horse power should be developed, giving a speed of eighteen knots, and with eighty-five revolutions, natural draught, 9,500 horse power, giving a speed of about seventeen knots. The machinery weighs 1,178 tons. The normal coal capacity is 800 tons, or enough for 4,000 knots steaming, but when all subsidiary bunkers are full, coal for 5,000 knots can be carried. The cost of Le Carnot will be, for the ship $4,800,000, for her gun and torpedo armament $520,000, and for machinery and boilers $636,000, or in all, $5,956,000. The armament will consist of two 11.8-inch guns, one in a 1.46-inch turret forward, and the other in a similar turret aft, the forward gun being 26 feet and the after gun 19.5 feet above the water line; two 10.6-inch guns, one in a 14.6-inch turret on each beam, eight 5.5-inch quick-firing guns, mounted singly in 3.9-inch turrets, four on each beam, four 2.5-inch quick-firing, twelve 1.8-inch quick-firing, and eight 1.45-inch quick-firing or Maxim automatic guns. There will also be four above water and two submerged torpedo-launching tubes. The most significant feature of the vessel is the enormous power of her right ahead and right astern fire. In each case this is furnished by one 11.8-inch, two 10.6-inch, and four 5.5-inch, besides smaller guns. Beam fire is furnished by two 11.8-inch, one 10.6-inch, and four 5.5-inch guns, so that in every direction the ship is offensively strong to an exceptional degree.

AN EXTRA COPY OF THE PHOTO-GRAVURE SUPPLEMENT OF DIRECTORS OF THE LAKE CARRIERS' ASSOCIATION, TOGETHER WITH THE LARGE ENGRAVING OF THE STEAMER NORTH WEST, BOTH OF WHICH WERE CONTAINED IN OUR BIG ISSUE, WILL BE MAILED IN A PASTEBOARD TUBE TO ANY ADDRESS UPON RECEIPT OF 50 CENTS IN STAMPS.


The very same low Niagara Falls excursion rate will be offered Aug. 2, by the Nickel Plate road. Look into the matter and ask our agents. 56

The Nickel Plate road has authorized its agents to sell tickets July 30 and 31, to St. Paul, Minn., at rate of one fare round trip, good returning until Aug. 7. 26

## Private Dock Property at the Canal.

EDITOR MARINE REVIEW:—Your edition of the 19th inst. contains an article referring to the eastern approach to the St. Mary's Falls ship-canal, which might be taken as reflecting someweat upon us as owners of the property in question. We admit that we are probably quite as much a hindrance and a cause of delay and danger to vessels entering the lock as you state, but we are not so wilfully; nor do we do more than take care of our business and property, and we seldom refuse the use of the dock or our snubbing posts when not in use to vessels entering the lock.

Whatever the supposition may have been, we have never endeavored to sell our property and have never been approached by the government with the view of their buying it. They could have acquired it at any time since we have owned it, and can still do so, if they desire, at a valuation that should be satisfactory to any desirous purchaser, but so long as we continue to own it, and the rights of private property are respected, we must take care of our investment and business, even if by so doing we sometimes interfere with the traffic of the canal.

UNION DOCK AND COAL CO.

## Around the Lakes.

The spar buoy reported adrift from Sand point, off Escanaba, Mich., has been replaced.

The Minnesota Iron Company is said to have purchased the Virginia mine, one of the Humphreys properties on the Mesabi.

Capt. Rollin H. Purdee, who was known among the older lake-faring men as a resident of Huron, O., died in Cleveland last week. The burial was at Huron.

L. O. Boostrom of Galesburg, Ill., is experimenting on small boats in Detroit with a patent wheel, which differs radically in construction from the ordinary form of screw wheels.

Tonnage of the last wooden steamer to be built by Capt. James Davidson for some time to come is 1,203.22 tons gross and 912.26 net, and the name selected for her is Madagascar.

Although Chicago tug owners claim that experiments made by the city with oil for fuel aboard tugs were by no means successful, it is announced that the anti-smoke league of the city will make an effort to enforce its use on the tugs.

A steamer of the whaleback type built in England, the Sagamore, arrived in New York a few days ago from Tampico, and her officers are reported as claiming that she makes twelve knots an hour on an expenditure of sixteen tons of coal in twenty-four hours.

It is probable that the Cleveland, Lorain & Wheeling Railroad Company will encounter difficulty in seeking a remission of even part of the fine of $500 imposed upon the tug Selah Chamberlain of Lorain for carrying passengers without a license. Violation of the law is said to have been flagrant in the Chamberlain's case.

Harmony is wanting among marine reporters on the Detroit dailies. One of them announced a few days ago that a new stack had been placed in the steamer John V. Moran, and the fellow who considers notes of this kind too insignificant for his column answered that "the scow Nonesuch, Capt. Starvation, will receive a patch in her mainsail as soon as freights improve."

If negotiations between the Chicago Ship Building Company and Pickands, Mather & Co. of Cleveland, for the two tow barges that have been under consideration for some are satisfactorily concluded, they will be constructed on the channel system introduced by Sinclair Stewart, surveyor for the Standard Register of New York, and they will be given a high class in that register.

Mr. Charles Tucker, Cleveland representative of the Northern Steamship Company, says that on last week's trip the passenger steamer North West had a list in all of 305 passengers. Leaving Cleveland on Wednesday of this week the passenger list, he says, numbered 225 and eighty more were to be taken on at Detroit. This would certainly indicate a profitable business for the big boat.

Work on the new steel steamer J. W. Nicholas, being built by the Cleveland Ship Building Company for Philip Minch and others, is sufficiently advanced to warrant launching probably within two weeks. This steamer will be a first class freight boat in all respects, and her construction as regards staunchness will compare with any of the best boats on the lakes. It is hoped that she will be out in time to make a few trips in the fall.

Frank S. Parker who is a candidate for congress in the seventh district of Michigan, which includes Marine City and St. Clair, is a son of Dr. L. B. Parker, who was one of the early promoters of the Detroit and Cleveland Steam Navigation Company. The family has for years been interested in vessel property. Mr. Palmer would undoubtedly prove a capable representative of lake shipping interests, if elected to congress.

A note in one of the Canadian papers says that the North West in passing down the St. Clair river the other day raised a swell so high that it broke the lines of the big Canadian Pacific steamer Algonquin, and nearly threw her up on the wharf at Sarnia. The writer suggests that when Mr. Hill gets out other boats of his passenger fleet the Canadian and United States governments might as well sell him the St. Clair river.

A large hydraulic dredge is being built at Benton Harbor by F. A. Blackmer, and it is something new to the lake region iu the way of dredges. It will carry the excavated matter 2,000 feet from the machine, thus enabling the contractor using it to excavate and build up the land on each side of the channel at the same time without the use of scows. The pumps and dredging apparatus will be operated by a fifty-horse-power engine.

Collingwood (Ont.) Bulletin.—"The supplement of the MARINE REVIEW of June 30, is a work of art. It comprised six large plates, views of the interiors and other portions of the steamer North West. The excellent reproductions are printed from enameled copper plate photo-engravings. Primarily first class photographs are required. The large supplement of the North West showing her approaching on the quarter has been pronounced to be the finest photographic view of a steamer published. The decorative view at the top shows Bois Blanc island at the mouth of the Detroit river, the prettiest spot between the two lakes."

## Fighting for Raft Regulations.

Since it was learned that the lumbermen had succeeded in causing the senate committee on commerce to change the rafting regulations in the river and harbor bill, so that the size of rafts to be permitted in the St. Clair and Detroit rivers is greatly increased, and no limit placed on size for the St. Mary's river, Cleveland officers of the Lake Carriers' Association have been constantly in communication with representatives in Washington with a view to again changing the bill. Mr. Harvey D. Goulder, counsel of the association, writing regarding the regulations as they affect the Sault river says:

"The point which has doubtless been made for the raft interests before the senate committee is that in a short time the Hay lake channel will be thrown open to navigation; that no regulation is therefore necessary, since the tugs towing rafts will come down the old channel now used. The fallacy of this position lies in the assumption of two false premises:

"1. That all of the old channel will be abandoned by the lake fleet.

"2. That there will be any substantial abandonment of that channel.

"In the first place the Hay Lake channel leaves the present channel a few miles below the Sault, and re-unites with it at the foot of Sugar island, from which place down to Mud lake, a distance of some miles, occurs what I believe is regarded the most difficult piece of navigation in the river. That is to say, bound down a vessel turns to the east nearly at a right-angle just at the foot of Little Mud lake, and in a very short distance turns again towards the south at nearly a right-angle. The land is somewhat high and wooded, as you know that country to be, so that vessels coming up below and those coming down above this double turn do not ordinarily see each other. At the upper turn is the place which you have yourself often heard spoken of with dread by sailors and navigators as the Dark Hole. Below the second turn is the place known as the Encampment. The report of the army board, and the house bill as well, required rafts of the restricted size to be taken two miles into Mud lake below the Encampment before being made up into larger rafts.

"The navigation in this part of the river is intricate; there are shoals, the bottom is nearly everywhere of rock; hundreds of vessels have struck bottom in that locality; no worse place could be conceived of in which to encounter a raft. The new Hay lake channel does not in the slightest degree affect or modify navigation of this part of the river.

"2. On the second point, no rule has been made and none ever will be, to prevent steamers using the new channel in common with the old or present channel. There is abundant need for both channels, and you may rest assured that it will never be the policy of the United States government to abandon the present channel or to allow it to deteriorate. The only regulation you may look for will be one which shall have for its object the use of one channel by up-bound and the other by down-bound craft, and we do not know as yet enough about the Hay lake channel, its currents, difficulties and possibilities to even venture an opinion whether those who shall have that matter in charge for the government will recommend the use of the new or the old channel for down bound boats."

A British chart covering Lake Superior entire, including north shore, can be had from the MARINE REVIEW for $1.

PHOTOGRAPHS of sixteen lake steamers and two color plates will be mailed to any address for 50 cents. MARINE REVIEW, 516 Perry-Payne dlBg., Cleveland, O,

Nickel Plate road Niagara Falls excursion, Aug. 2. For information see agents. 26

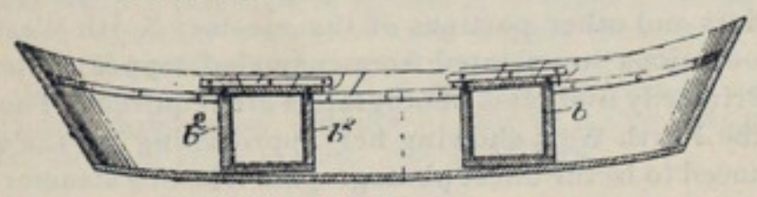
## Illustrated Patent Record.

SELECTED ABSTRACTS OF SPECIFICATIONS OF A MARINE NATURE—FROM LATEST PATENT OFFICE REPORTS.

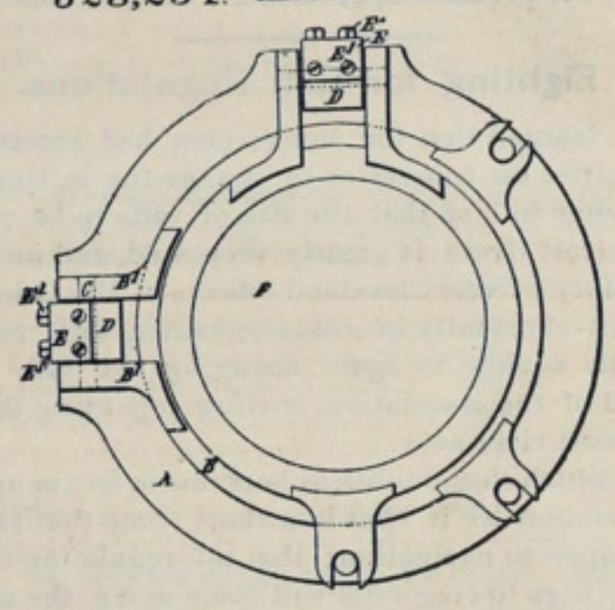
**523,151. BUOYANT SEAT FOR BOAT. Gilbert Perkins Wakefield, assignor of one-half to William H. Perkins, Gloucester, Mass. Filed Oct 11, 1893. Serial No. 487,882.**

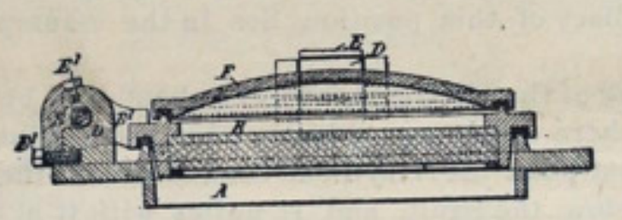
Claim—The combination with a boat, provided with a seat-supporting side rail *a*, and one or more cleats *a'*, of a removable seat adapted to be inserted between said cleat and rail, and an air-tight hollow float on and removable with said seat, the ends of the latter projecting beyond said float to rest upon said seat-supporting rails between the latter and said cleats.

**528,151. BUOYANT SEAT FOR BOATS.**



**523,251. SHIP'S LIGHT AND AIR PORT.**





**523,251. SHIP'S LIGHT AND AIR PORT. Thomas Utley, Liverpool, England. Filed Feb. 12, 1894. Serial No. 499,966.**

Claim—First, in a ship's side light, the combination of the frame A having the attached knuckle D forming one side of the hinge, the removable piece E, secured to the said knuckle and forming the other side of the hinge, the glass-holder B having the pair of projecting arms B′ embracing the said knuckle and the said removable piece, and the hinge-pin C permanently attached to said arms and removably seated in the knuckle on the frame and made separate from the said removable piece. Second, in a ship's side light, the combination of the frame A, the knuckle D forming one side of the hinge, the removable piece E secured to the knuckle D and forming the other side of the hinge, the glass-holder B having the hinge-pin C permanently secured therein, and the side wings $E^2$, $E^2$ of the piece E which pass between the knuckle D and the lugs B′ of the glass-holder.

## More Complimentary Notices.

The Engineer, New York: "The MARINE REVIEW, Cleveland, got out a special issue to illustrate the North West, and it was a very handsome one, showing the vessel in all conditions from start to finish. We are glad to note that our contemporary took advantage of its opportunity."

Canadian Manufacturer, Toronto: "The Cleveland, O., MARINE REVIEW of June 30 contained some fifty pages of illustrations and descriptive matter, including seven double page engravings illustrative of the new lake steamer North West, and portraits of the fifty-eight officers and managers of the Lake Carriers' Association. It is a study in politics to observe that while the policy of the United States for many years has not been to encourage the foreign commerce of that country as carried on in American vessels, in consequence of which, such traffiic is most discreditably small, the policy as affecting domestic commerce is such as to entirely exclude foreign vessels and to build up fleets of as fine and beautiful ships as can be found any where in the world, a beautiful specimen of which is the North West, over which the REVIEW goes into such raptures."

## Invention of the Screw Propeller.

Col. F. B. Stevens of the Hoboken Ferry Company belongs to a family that is distinguished in connection with the advancement of marine engineering in this country, and he has given the subject of screw propulsion a great deal of attention. In the current issue of Cassier's Magazine he has another article on "The Invention of the Screw Propeller." "The introduction of the screw propeller into use was accomplished," he says, "simultaneously by Smith in England and Ericsson in the United States. Both were men of great ability. Each considered himself the inventor of the screw propeller. Each took out patents in England, in 1836, and in the United States two or three years afterward. Each patent differed radically from the other. Neither patent, for the general application of the screw propeller, was sustained either here or abroad, and neither Smith nor Ericsson patented additional improvements on the screw propeller. Each built small screw vessels in England that were successfully tried in 1837, Smith's being of six tons burden, with a wooden screw, driven by a six-horse-power engine, and Ericsson's, named the Francis B. Ogden, having about double the tonnage and power. Each built larger screw vessels that were successfully tried in England in 1839. Smith's vessel, the Archimedes, being upward of 200 tons burden, and driven by engines designed by Rennie, of ninety horse power, circumnavigated the island of Great Britain in May, 1840. Ericsson's vessel, the Robert F. Stocton, smaller and with less power, was tried in England under steam, and then, in April, 1839, crossed the Atlantic under sail. Each introduced the screw propeller on merchant vessels in 1840. Each introduced the screw propeller on war vessels in 1843, Ericsson on the Princeton, and Smith on the Rattler."

## In General.

O. G. Heilman, instructor in the mechanical department, Sibley College, Cornell University, Ithaca, N. Y., died July 17 at Williamsport, Pa.

Chief Constructor Hichborn of the navy department is carefully considering a proposal for sheathing the new ironclads, in order to prevent the fouling of their bottoms.

Advances in Hudson river ferry boat construction are well shown by the cost of the boats. The Pioneer of 1823 cost $16,874.50; a wooden boat in the fifties cost about $50,000; the Montclair, the last of the North river side-wheelers, cost $120,000, and a screw boat, like the Cincinnati or Bremen costs $180,000.

It is proposed on the new triple screw cruiser Minneapolis to make some elaborate tests of the utility of the screws singly and aggregately. It is estimated that with one-third power and one screw 15 knots can be made, and with two screws and two-thirds power from 18 to 19 knots, the screws not in use being permitted to revolve freely.

Belleville boilers fitted to the Sharpshooter, torpedo gunboat of the British navy, have been subjected to several tests as to evaporative efficiency. Mean results recorded for eight hours' steaming on the latest and most successful trial were: 8.25 pounds of water evaporated per pound of coal, and 2.6 pounds consumed for each indicated horse power.

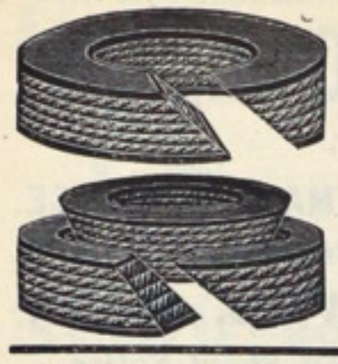
In the August number of Cassier's Magazine there are articles on "The Ferryboats of To-day," by by Col. E. A. Stevens, president of the Hoboken Ferry Company; "Modern Light-house Service," by E P. Adams, C. E., one of the United States light-house surveyors; "The Earliest Ironclad," by Prof. R. H. Thurston of Cornell University; "The First Steam Screw Propeller Boats," by F. B. Stevens, and a biography of Dr. Henry Morton, president Stevens' Institute of Technology, by Prof. Coleman Sellers, E. D.

The oldest light-houses or towers known were built by the Libyans in lower Egypt. They were temples also, and the light-keeper priests taught pilotage, hydrography and navigation. The famous tower on the Isle of Pharos at Alexandria, built about 285 B C., is the first light-house of undoubted record. This tower, constructed by Sostratus, the architect, was square in plan, of great height and built in offsets. An open brazier at the top of the tower contained the fuel for the light. At Dover and Boulogne, on either side of the English channel, were ancient light-houses, built by the Romans. But the light-house at Corunna, Spain, built in the reign of Trajan, and reconstructed in 1634, is believed to be the oldest existing light-house.—E. P. Adams, in Cassier's Magazine.

Have you heard about "Summer Outings," descriptive of picnic and summer resorts along the line of the Nickel Plate road; "Country Homes," a list of, open to summer boarders located on the Nickel Plate road adjacent to the south shore of Lake Erie; "Summer Tours," an illustrated and descriptive folder of famous resorts in the east; "Red Book," gives routes and rates for summer tours; issued by the Nickel Plate road? If you desire copies mailed free address B. F. Horner, general passenger agent, Cleveland, O. Aug 30

"SUMMER TOURS—The Nickel Plate road has placed on sale a complete line of tourist tickets to the resorts of the east, including Niagara Falls, One Thousand Islands, lower Canada, the Atlantic coast and the mountains of New York and New England. Address B. F. Horner, general passenger agent, Cleveland, O., for descriptive matter and full information. Aug 30

At 224 Bank street and 534 Pearl street, Cleveland, on Aug. 2, you may procure a ticket to Niagara Falls at $3.00 for the round trip, via the Nickel Plate road. 26



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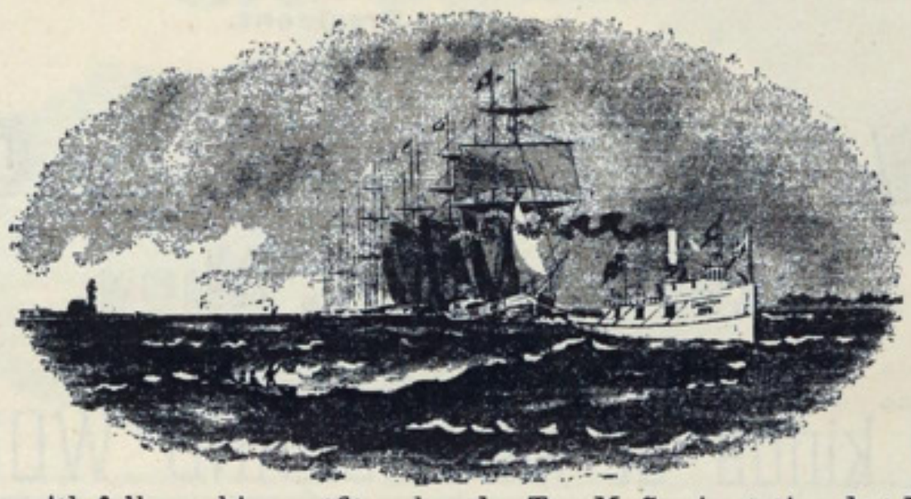

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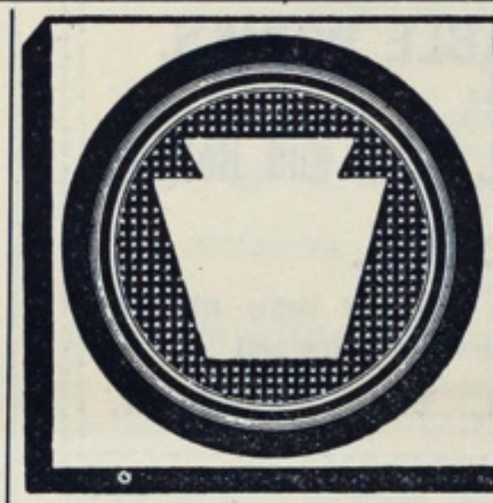

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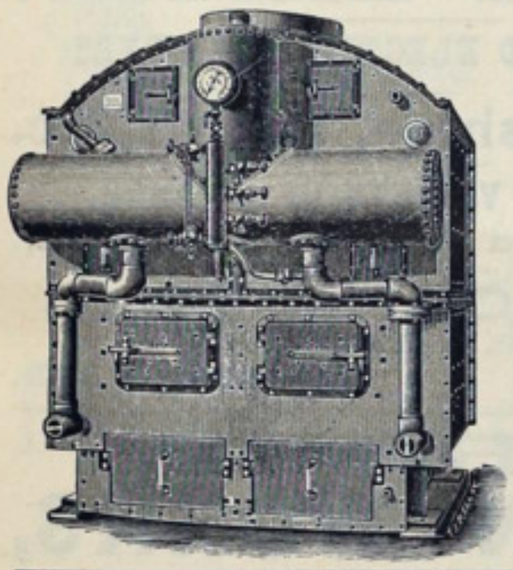

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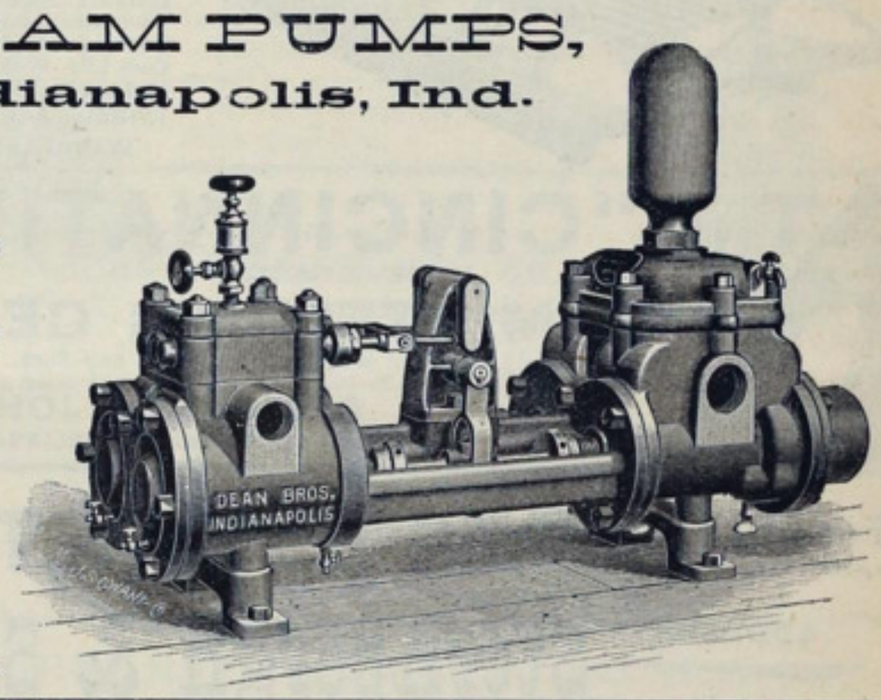


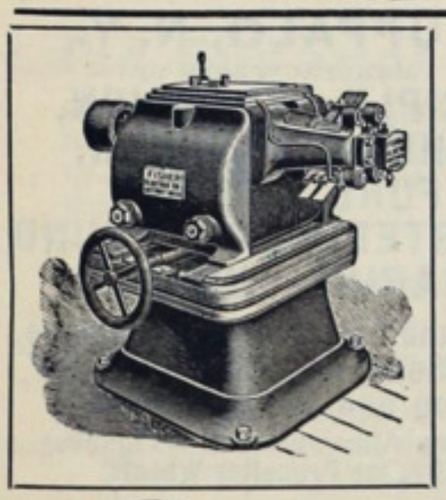

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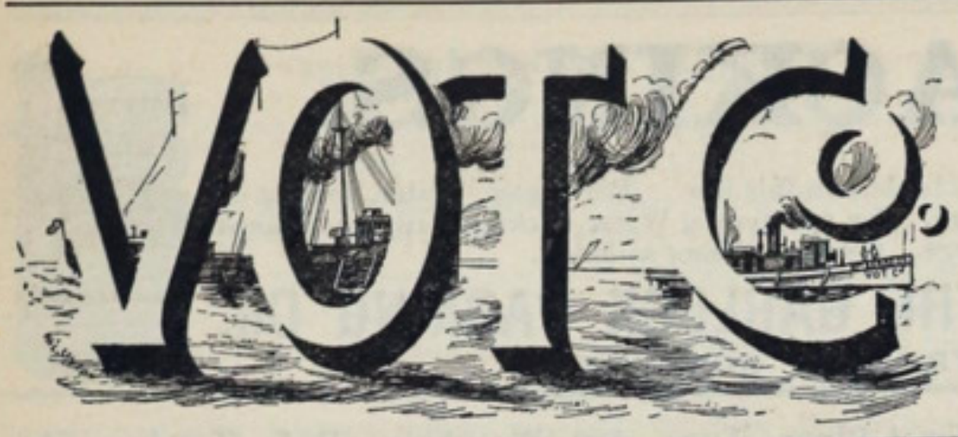


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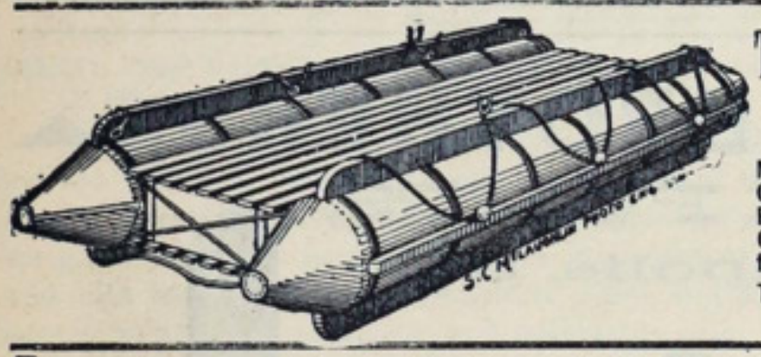

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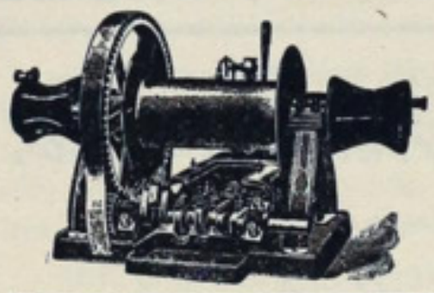

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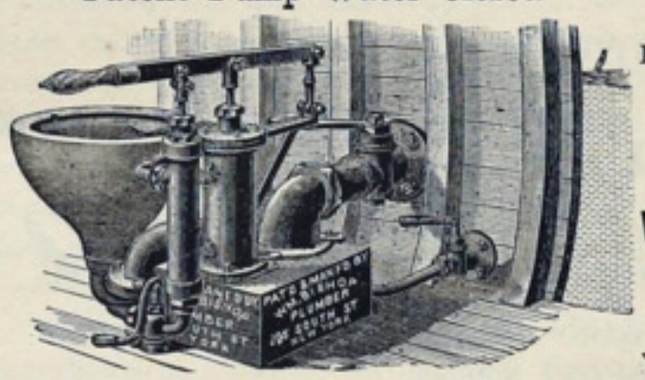

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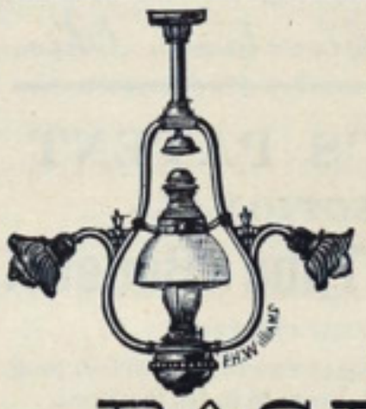

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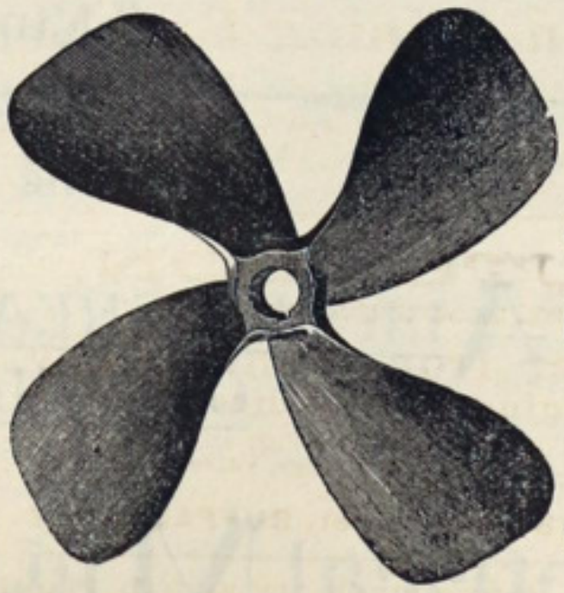

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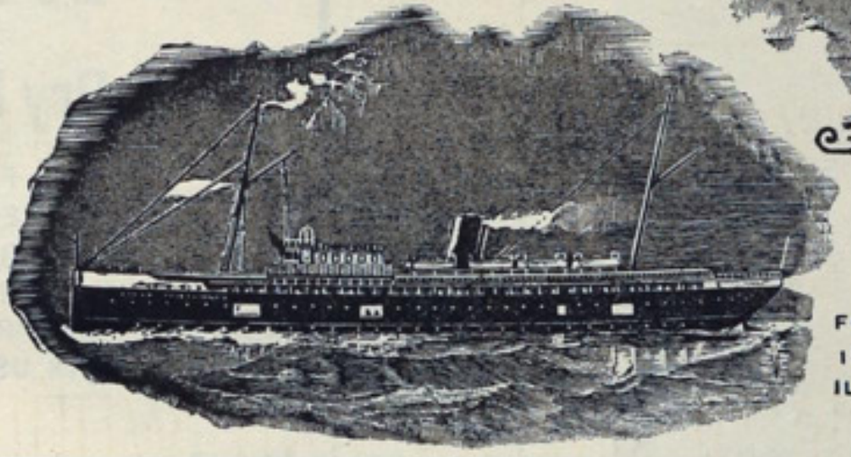

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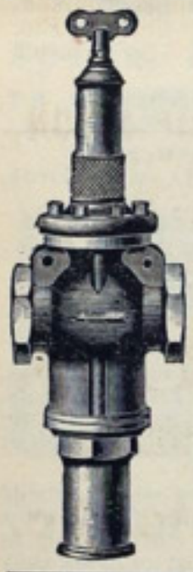

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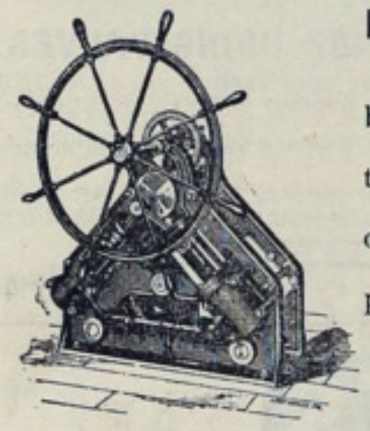

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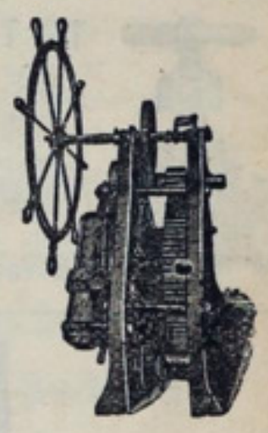

U. S. ENGINEER OFFICE, 34 West Congress street, Detroit, Mich., June 23, 1894. Sealed proposals for Power House and Office Building for the 800-ft. lock, St. Mary's Falls Canal, will be received here until 2 p. m. July 28, 1894, and then publicly opened. Information furnished on application.
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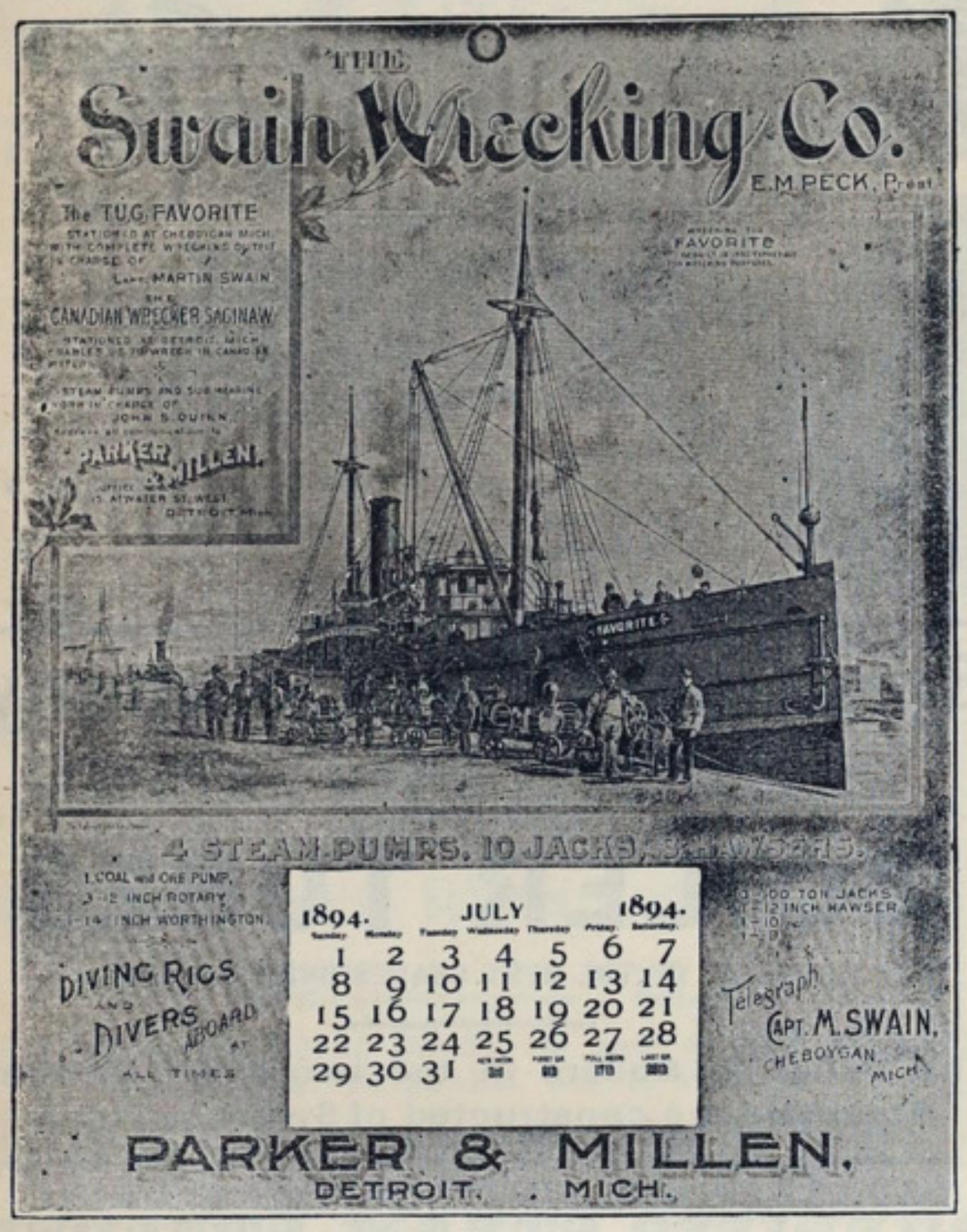


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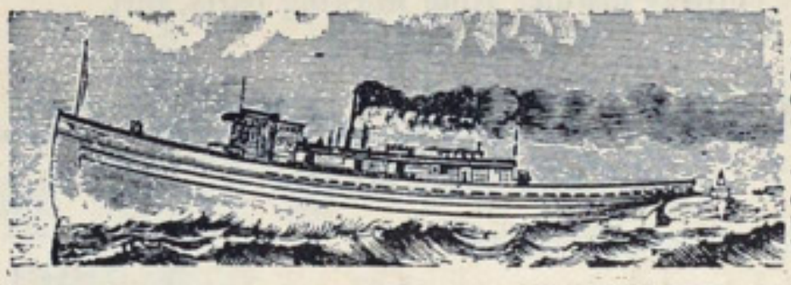

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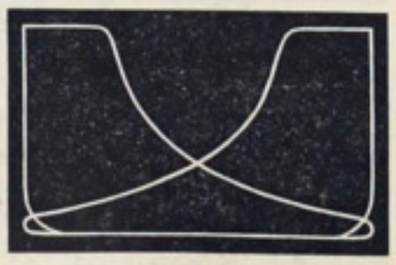

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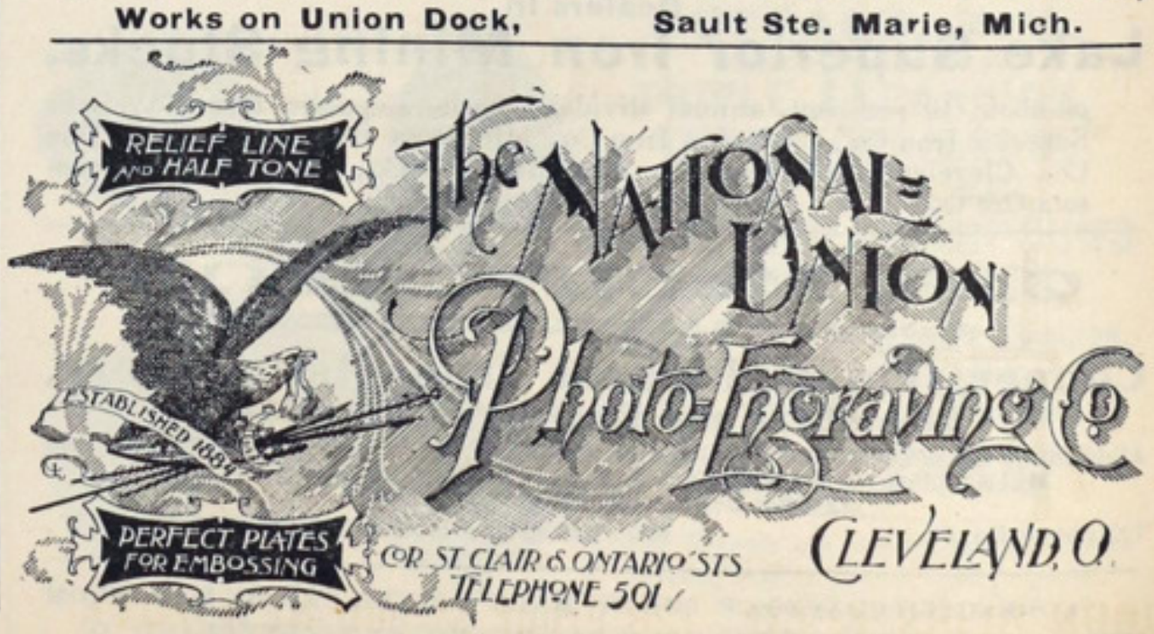

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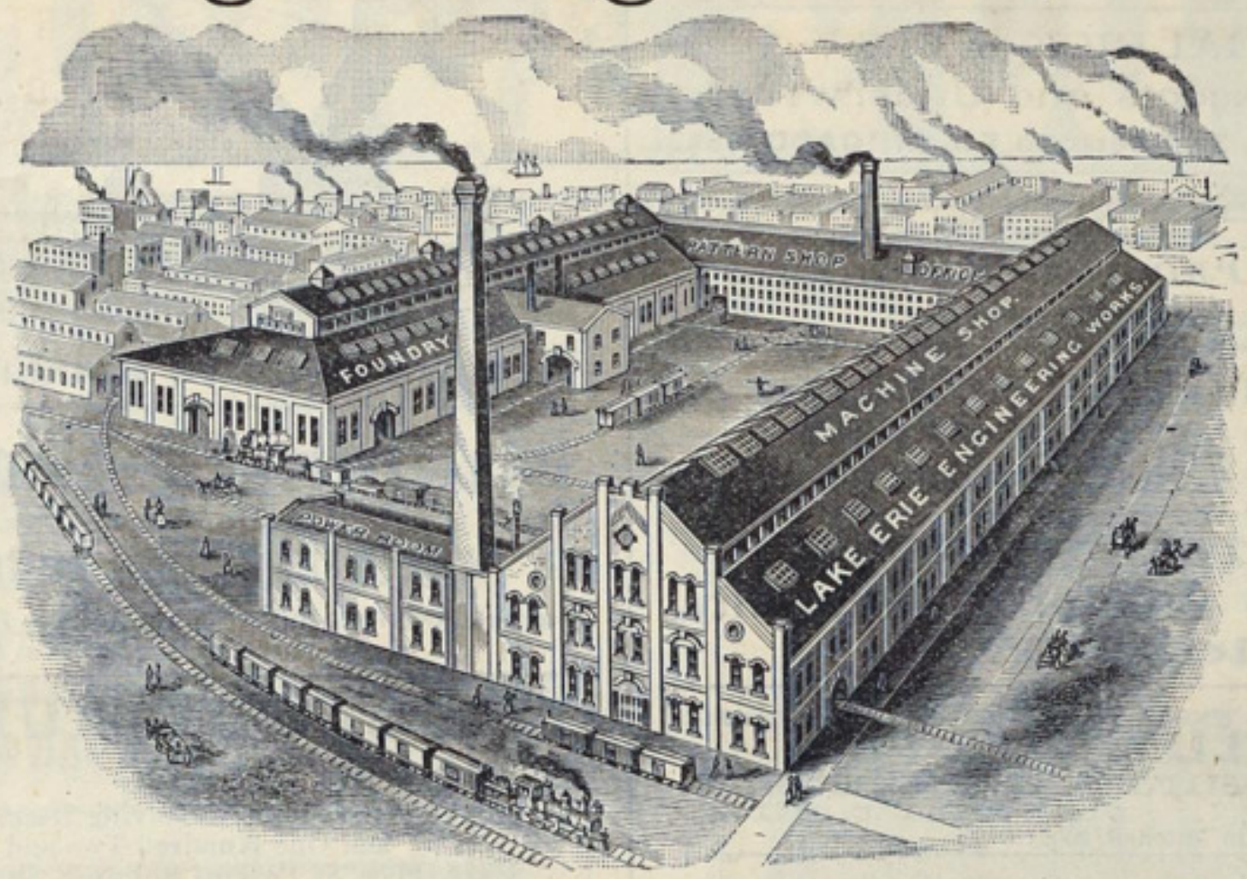


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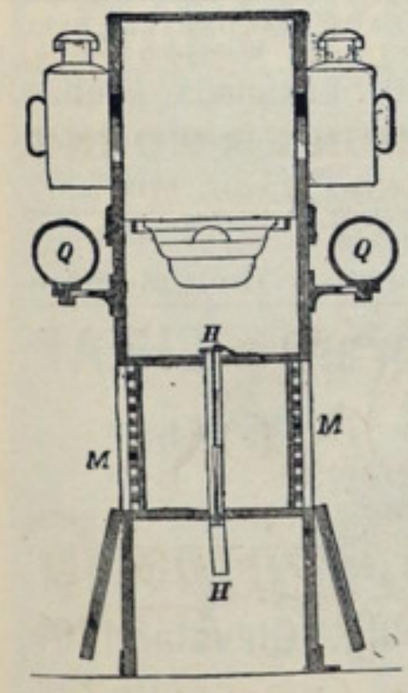


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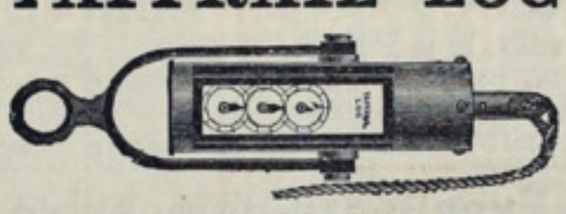

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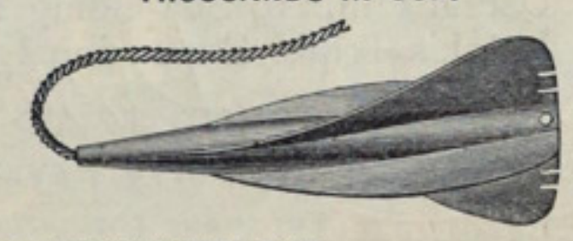

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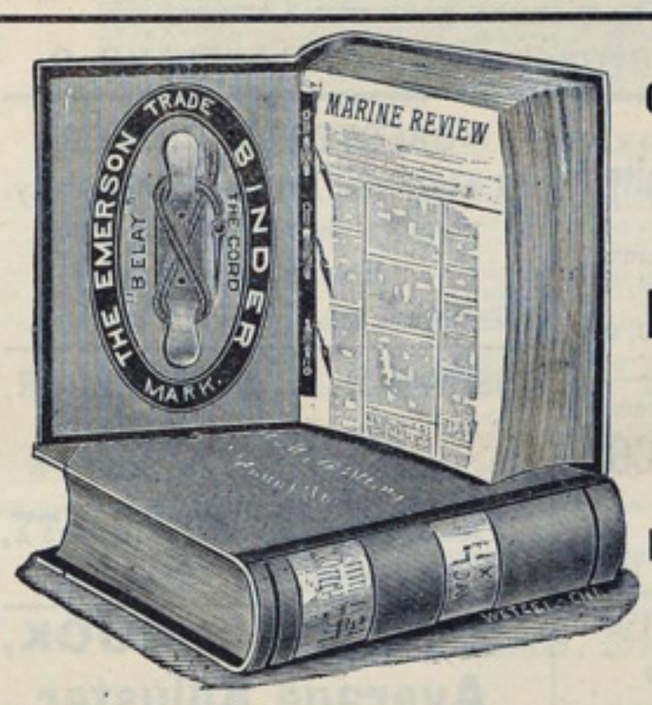


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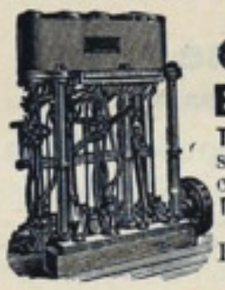

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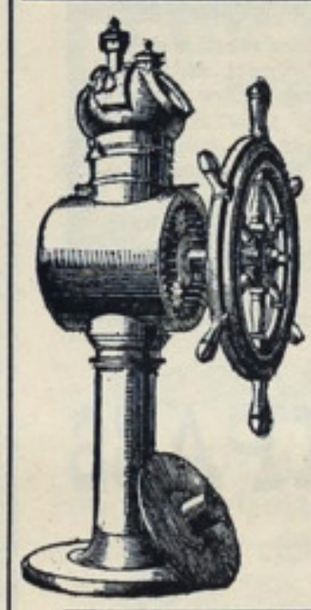

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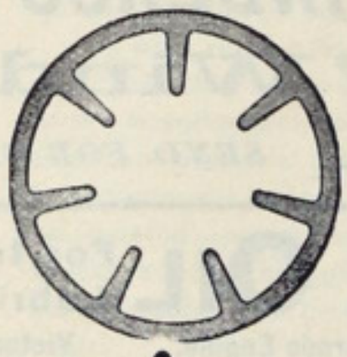

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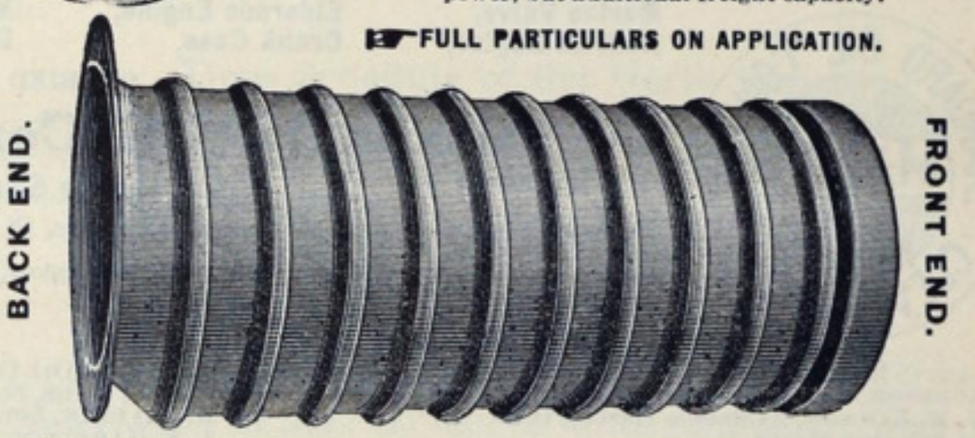


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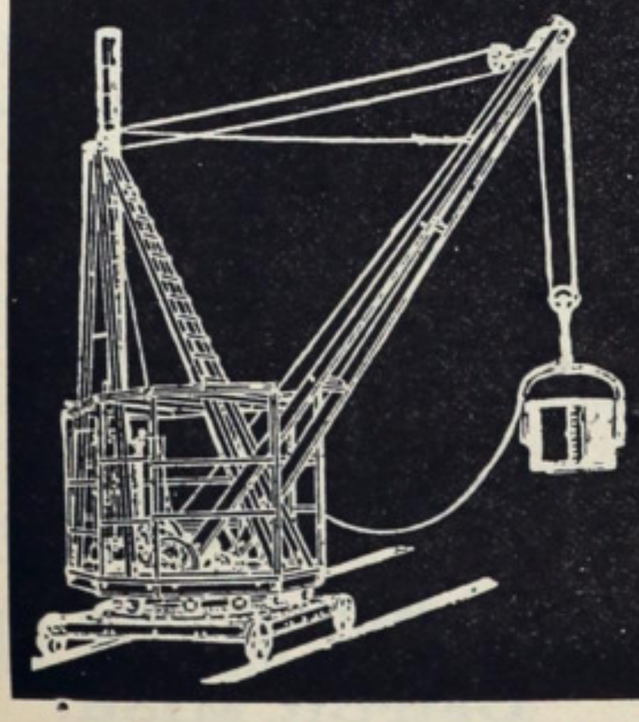

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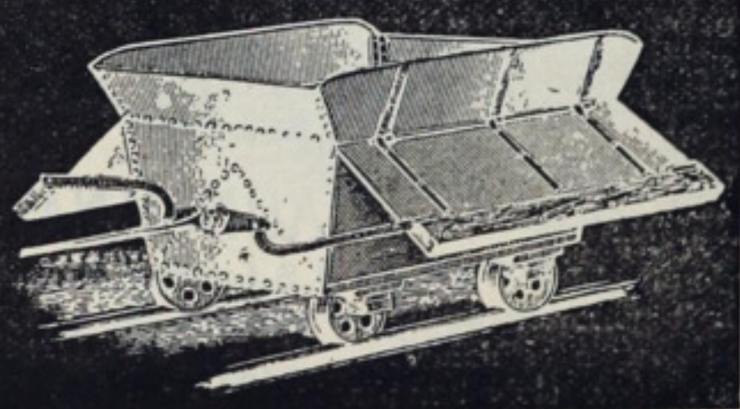

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AVOIDS DUST AND NOISE. SAVES COAL.
LIGHTENS LABOR. DOES NOT INJURE PAINT.

Particulars of the above and list of vessels where applied furnished on application.
Sole Manufacturer under the Patents,

HORACE SEE, No. 1 Broadway, NEW YORK.

## THE METROPOLITAN DOUBLE-TUBE INJECTOR.

ADOPTED by the Largest Shipbuilders and users, as it is . . . .

The Only Injector which Gives Satisfaction

UNDER the SEVERE CONDITIONS OF MARINE SERVICE.

SEND FOR OUR CATALOGUE 1894

THE HAYDEN & DERBY MFG. CO.

No. 111 and 113 Liberty St., NEW YORK.

## THE GEO. F. BLAKE MFG. CO.



AIR PUMP ON U.S. CRUISER NEW YORK.

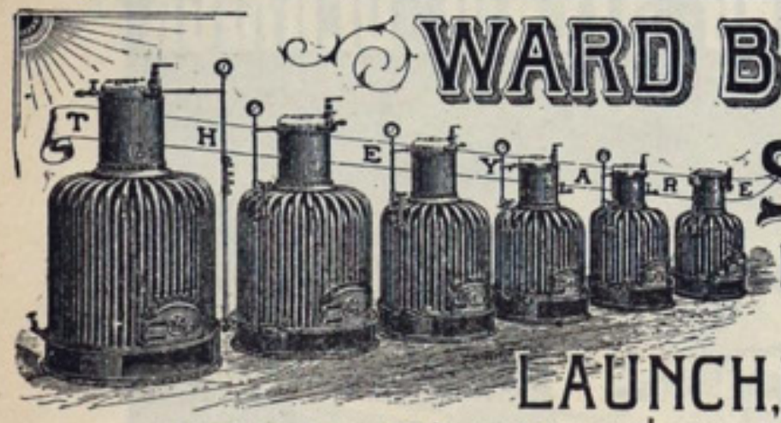
BUILDERS OF

## MARINE PUMPS

Single and Duplex Pumps for Boiler Feed, Fire or Bilge Service—Vertical and Horizontal.
Vertical and Horizontal Pumps, Air Pumps for Surface and Jet Condensers.

95 and 97 Liberty St., NEW YORK.

## WARD BOILERS FOR STEAMERS LARGE OR SMALL




LIGHT WEIGHT, GREAT POWER

THREE TYPES,

LAUNCH, NAVY AND MARINE.

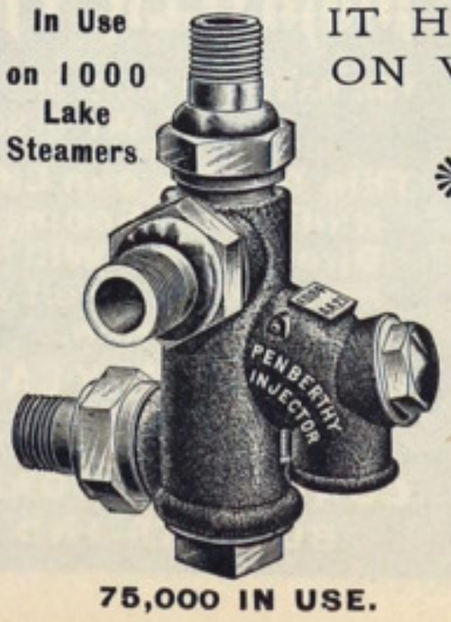
ADOPTED BY U.S. GOVERNMENT. WAR VESSELS, LAUNCHES, REVENUE CUTTERS, TUGS.

AFTER THE MOST EXHAUSTIVE COMPETITIVE TESTS. Correspondence Invited.

CHARLES WARD,

CHARLESTON, KANAWHA CO., W. VA.

In Use on 1000 Lake Steamers




75,000 IN USE.

IT HAS NO EQUAL ON WATER OR LAND.

ITS MERITS ARE EVERYWHERE ACKNOWLEDGED.

Insist on having a

## PENBERTHY Automatic INJECTOR.

PENBERTHY INJECTOR CO.

Detroit, Mich.